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ABSTRACT

This study proposed to examine the feasibility of implementing the total Florida State University Model for Preparing Elementary Teachers, by analyzing the cost/management factors and the human factors involved. It presents a conceptual extension of the specifications to an implementable instructional model, which was utilized as a theoretical basis for developing and implementing with trainees a prototype of the model curriculum. The total management system is described, with the rationale for management techniques, the procedures utilized, detailed descriptions of instructional management and costing systems, and findings based on the field tests. Inter-institutional collaboration and faculty development are described, as well as start-up requirements and projections of cooperating capabilities and requirements. One section deals with feasibility under the heading of "Constraints." An appendix contains a variety of items important to the understanding of the report, including a position paper on the rationale for fiscal management, much actual data from prototype operations, and samples of the many printouts available from the computerized management systems developed. (Author/MBM)

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FINAL REPORT

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A FEASIBILITY STUDY OF THE FLORIDA STATE UNIVERSITY MODEL FOR THE PREPARATION OF ELEMENTARY SCHOOL TEACHERS

Norman R. Dodl
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December 1969

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PREFACE

Former Dean J. Stanley Marshall stated in the preface to Volume I of the F.S.U. Model for the Preparation of Elementary School Teachers:

> The College of Education of Florida State University has accepted the challenge to develop specifications for such a model program. While we have felt the need to redesign our elementary teacher education program for some time, the support of the Office of Education has advanced the schedule somewhat and has made it possible to do a more thorough job. We have been able to recruit a most able interdisciplinary group of people from throughout the University and beyond, and an out-standing feature of the present product is the flavor that this wide range of interest, talent, and experience contribute to the Model Program Project.

The continued support of the Office of the Dean of the philosophical approach to teacher education which is embodied in the Florida State University Elementary Model project is hereby reaffirmed. Indeed I believe the structuring of a teacher education program around measurable performance criteria and organized to permit self pacing and program entry at any point is an approach that is badly needed and long overdue.

The challenges that lie ahead in converting to and implementing this approach while formidable are surmountable. The same dedication, skill and design leadership utilized in conceptualizing this approach has been applied to this feasibility study. We now see clearly the task at hand and are anxious to get on with it.

Phillip R. Fordyce
Dean
College of Education
Florida State University

ACKNOWLEDGEMENTS

This feasibility study in a very real sense represents an extension of the major conceptual efforts of the F.S.U. Phase I Model design project. As was the case in that study, large numbers of persons from Florida State University and from agencies throughout the State of Florida have had a part in making this report possible. Without the continuing commitment of these agencies and the dedicated contributions of the many persons representing them, this study could not have been undertaken.

I am most grateful to Dean Phillip Fordyce of the College of Education for his support of the project. Dean Fordyce always managed to clear his calendar for participation in model activities and he provided invaluable financial resources beyond those of the project budget. Special recognition must also be given to the F.S.U. Graduate Research Council which made a sizable award to the project without which many of its activities could not have been completed.

Many of the same team members who designed the F.S.U. Phase I Model have been major contributors to this study. G. Wesley Sowards, who was project manager for the Phase I study, initiated this project and served as a member of the leadership team which guided the activities of the project staff. W. Earl Armstrong also continued as a member of this team and made significant contributions both to the conceptualization of the study and to its conduct.

From among the many Florida State University faculty and staff members who contributed well beyond that which was expected of them, I wish to especially recognize the important contribution of W. Guice, E. Hakason, and P. Nelson. These professors provided the leadership for developing and implementing the curriculum and instruction prototype. I am also particularly grateful to Marshall Harris whose work as project fiscal analyst was especially noteworthy among project staff members.

The entire team from the F.S.U. CAI Center deserves special commendation. Under the leadership of W. Dick, this team developed specifications for the computer management system and implemented a prototype of that system to gather data for this project.

Many agencies contributed to this study. Although the list of key agency staff members who participated on many occasions is too long to include here, the Florida State Department of Education, the Board of Regents of the Florida State University System, the Leon County Public School District, and the Broward, Miami-Dade, Tallahassee, North Florida and Hillsborough Junior Colleges contributed invaluable resource assistance.

Prominently involved in all aspects of this study was a group of dedicated, capable and hard working graduate students. Peggy Bell, Clark Dobson, Claire Duncan, Otto Eckman, Tony Jones, Art King, Paula Martinez, Susan Pflaum and Gary Schroeder all played significant roles throughout the study.

And of course, the project could not have functioned nor could this document have reached final stages but for the very capable secretarial assistance of Erica Clark and Cathy Carney. To them as well as to all the other contributors to this study, I am very grateful.

Norman R. Dodl

Tallahassee, Florida
December 1969

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CHAPTER I

RATIONALE AND OVERVIEW

Since 1967 personnel at the Florida State University have been involved in the Elementary Teacher Education Project of the Bureau of Research (USOE). The participation of the Florida State University in Phase I of the project resulted in a final report, A Model for the Preparation of Elementary School Teachers, completed in October, 1968. In the interim between October and March 1969, a proposal was developed and submitted for participation in Phase II of the project, a study of the feasibility of implementing the Florida State Model. The Phase II proposal was funded beginning May 1, 1969, the results of which are reported in this document.

Rationale

The results of investigations into three essential areas of concern underlie the rationale for the creation and implementation of this model program. These areas of concern are (1) predictions of what society and education will be like by 1978, (2) inferences about the nature of teaching and the role of the elementary school teacher by 1978, and (3) implications for the preparation of elementary school teachers. The findings of these investigations all point to a definite and crucial need to alter our present mode of teacher preparation in order that we might more adequately prepare elementary school teachers for their role in the schools of 1978.

Concerning the society of 1978, predictions picture an increase in urbanization, continued protest and challenge of traditional values, group rather than individual identity, and an even greater alienation of youth as a group. In addition, political issues will become increasingly complex, and attempts by the federal government to alleviate social ills will be stepped up. Issues will be constantly kept before the public by multiple mass media. The dominance of science and technology, and the unique influence of an international character of life upon social, political and economic affairs will create new problems requiring sound and effective solutions.

How will this society of 1978 affect education? There will naturally be increased demands for meaningful programs which serve the needs of the people. That these demands will aggravate the already existing tension between educators and the general public is evident. That these demands will be met through increasing attention to the individual is certain. In keeping with these findings, teachers will strive to become more and more autonomous, while curriculum developers work to integrate subject matter into more inter-disciplinary designs. Finally, schools and inner city schools in particular, will have to relate more directly to the total environment with an increasing emphasis upon relevance in learning.

What significance have these findings regarding elementary school teachers? The inferences are that the elementary school teacher must be of high ability and broadly educated in order to cope with the difficult problems he will encounter. Concentration on at least one academic area with competence in employing a wide range of teaching strategies will mark the successful teacher. An ability to work as an effective team member and an ability to meet continuous transition and educational change will be necessary. Of particular significance to the model program is the implication of a need for a pre-service/in-service continuum of experiences in order to fulfill initial training requirements.

As a result of a task analysis of teaching as forecast for 1978, five essential teacher behaviors became apparent. The development of these behaviors listed below is the essential aim of the Florida State University Model Program.

1. The teacher will plan for instruction by formulating objectives in terms of behavior which is observable and measurable.
2. The teacher will select and organize content to be learned in a manner consistent with both the logic of the content itself and the psychological demands of the learner.
3. The teacher will employ appropriate strategies for the attainment of desired behavioral objectives.
4. The teacher will evaluate instructional outcomes in terms of behavioral changes.
5. The teacher will demonstrate the competence and

willingness to accept professional responsibilities and to serve as a professional leader.

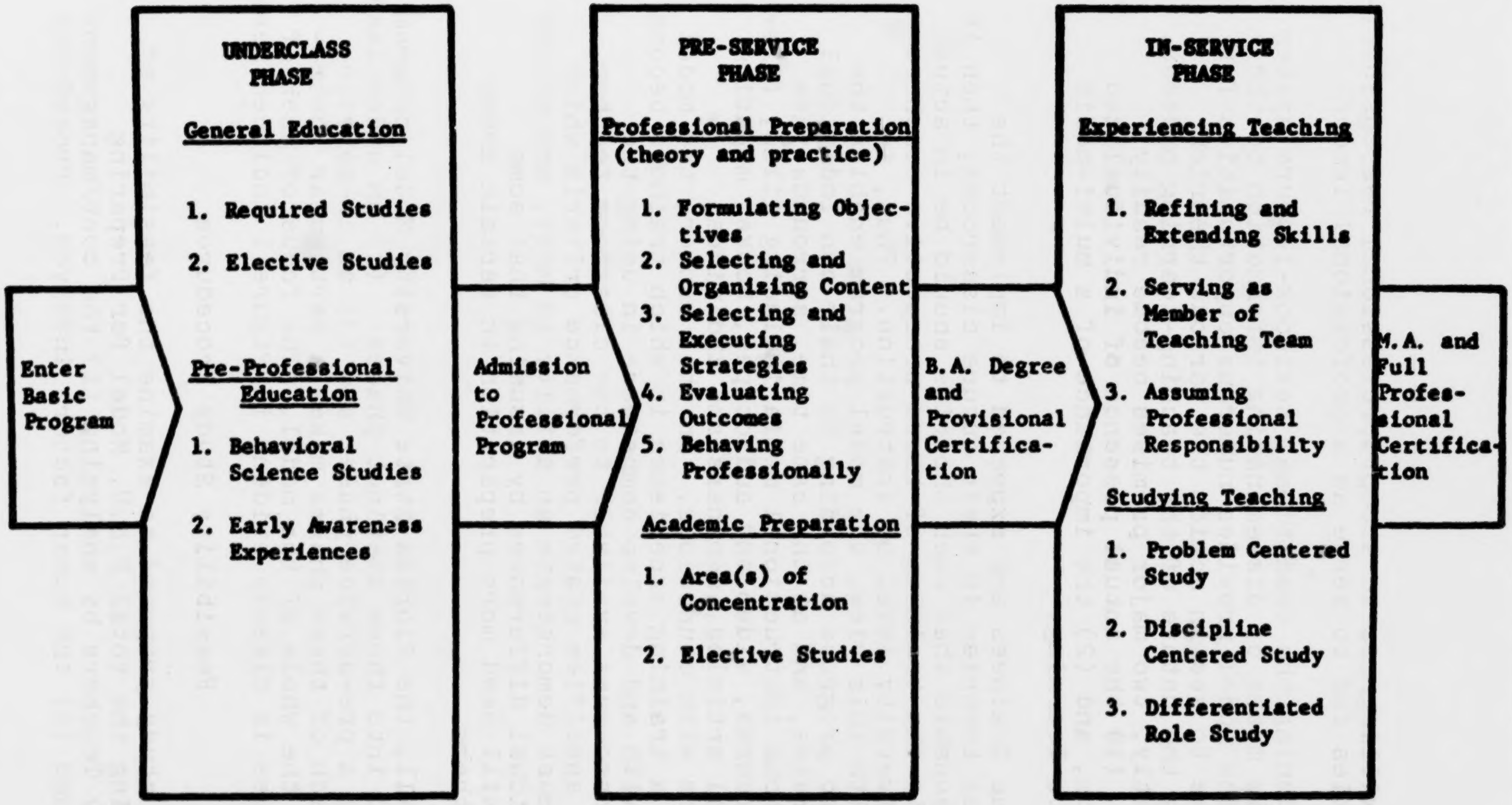
Abandoning the traditional textbook-lecture system as the sole means of disseminating information to the learner,-the model provides numerous opportunities for the trainee to see in action the various theories concerning the nature of the teaching-learning process. Significantly, two major premises become readily apparent: (1) the actual presence of individualized instruction, and (2) the importance of a multi-media approach to learning.

If the trainees are expected to implement the educational theories in their future classrooms, then it seems reasonable that such theories should be in actual practice in the training of these prospective teachers at the university level of instruction. Thus, in keeping with this view, the model program enables the trainees to progress according to their own individual learning rates, and at the same time, surrounds them with numerous instructional media including films, filmstrips, records, video and audiotapes, books, magazine and journal articles, seminars and individual conferences with counselors. In this manner, the model serves as a training experience in which trainees become familiar with and develop competence in using the numerous resources available to the classroom teacher. The model specifies stated performance criteria which trainees must demonstrate an ability to meet, and allows for individual differences by assuming that some trainees will need more preparation in certain areas than in others.

Overall, the Florida State University Model program is divided into three distinct phases: (1) an underclass phase, (2) a pre-service phase, and (3) an in-service phase. Each of these phases makes a particular contribution to the whole of the model. The focus of each of these phases is clearly evident in Figure 1 included here.

Feasibility Study Procedures

This study proposed to examine the feasibility of implementing the total F.S.U. Model for Preparing Elementary Teachers by analyzing (1) the cost/management factors, and (2) the human factors involved. Procedures


Enter Basic Program
UNDERCLASS PHASE
General Education
1. Required Studies
2. Elective Studies
Pre-Professional Education
1. Behavioral Science Studies
2. Early Awareness Experiences
Admission to Professional Program
PRE-SERVICE PHASE
Professional Preparation (theory and practice)
1. Formulating Objectives
2. Selecting and Organizing Content
3. Selecting and Executing Strategies
4. Evaluating Outcomes
5. Behaving Professionally
Academic Preparation
1. Area(s) of Concentration
2. Elective Studies
B.A. Degree and Provisional Certification
IN-SERVICE PHASE
Experiencing Teaching
1. Refining and Extending Skills
2. Serving as Member of Teaching Team
3. Assuming Professional Responsibility
Studying Teaching
1. Problem Centered Study
2. Discipline Centered Study
3. Differentiated Role Study
M.A. and Full Professional Certification

A THREE PHASE PLAN FOR PREPARING ELEMENTARY TEACHERS

FIGURE 1

for assessing feasibility consisted primarily of two major types of tasks:

1. It was proposed to develop a major management model, consisting basically of computerized data files and programs to interface these files for simulation of the total program operation based on specified program parameters and alternative arrangements of elements within the program.
2. It was also proposed to develop prototypes of several basic components of the program, i.e., the curriculum and instruction model, the faculty development component, and an inter-institutional component. These prototypes were to be small scale implementations for the purpose of furnishing a realistic data base for the management model simulation, and for gathering evidence on the human feasibility of implementing the F.S.U. Model.

As the study evolved, a number of factors led to modifications of the proposed procedures for developing a base for ascertaining feasibility. For instance, the total management model took on more significant proportions than originally anticipated, while at the same time, yielded to certain re-conceptualization. As work progressed on two fronts, that of project staff management operations and that of longitudinal management operations conducted by a subcontractor, it became evident that the capability existed to generate a true prototype of the total management model. It was also discovered that adequate data would be available from the curriculum and instruction prototype to field test the management model. Such a field test would effectively provide a realistic picture of that total set of constraints which would ultimately have to be overcome if successful implementation were to occur.

The product of this aspect of the study, therefore, is a first generation computerized management system capable of total program management as well as simulation for the purposes of planning. This management system is focused on program operation and not on development cost and phasing operations, since they constitute a less complex set of problems. Building prototypes during the study led to the conclusion that start-up costs need to be considered as one-time expenditures and accounted for independently. Thus, operational procedures will include routine provisions for continual development and redevelopment, but not start-up costs.

In the truest sense of the word, actual simulation of the total program model was not conducted. Project staff, subcontractor, and consultants concluded that since most data entered into master curriculum and performance files would have to be arbitrary extrapolations from the curriculum and prototype operation, decisions based on these extrapolations would be no better made via computer simulation than via logical deduction and projection. Although the computer programming necessary to conduct such simulation has been done, the results of curriculum development work that will take several years to complete is needed for such simulations to yield meaningful and reliable results. However, when more development work is complete or when the program is in full operation, this capability for simulation will be of great value as a management tool.

It soon became evident that budget constraints would render difficult the development of three prototypes within the brief time span of the project. Very early in the study it was decided that the most productive project effort of a prototype nature would be a sample implementation of the curriculum and instruction features of the model specifications. Along with the development of the management prototype, the development and implementation of a curriculum and instruction prototype received major attention of the project staff throughout the period of study.

Throughout the summer of 1969, an inter-disciplinary faculty team, with the required media and program assistance, developed the curriculum and instruction prototype. It was pilot tested with sample trainees in October of 1969. Although a limited effort, this activity did involve faculty and trainees in types of activities which were deemed essential for the implementation of a total program. Faculty and trainee reactions, responses and attitudes were continuously elicited and carefully noted throughout the operation of the prototype. Data on trainee performance were systematically gathered and computer processed.

Realizing that new instructional skills will be required of those now presently instrumental in the preparation of teachers and of others not previously involved in teacher preparation, a faculty training prototype was planned in order to determine the parameters of an appropriate approach to broad faculty training. Parallel funding had been sought to operate this prototype. When such funding was not forthcoming, a somewhat scaled-down effort was conducted in this area. The major effort in this area consisted of involving faculty and others in an intensive study of model specifications in order to build the curriculum and instruction prototype, and in performing functions very different from their normal teacher education roles in the implementation of the prototype.

As the Florida State University Model Program requires a multi-institutional setting for final implementation, it will be necessary to create a network of institutions in order that all phases of the program might operate successfully. Optimal conditions would provide a setting in which the various administrative and instructional levels of personnel could communicate, negotiate and generate essential organizational and programmatic solutions to implementation problems. Although activities in this area did not reach the prototype stage and thus did not yield the type of data anticipated, it did furnish considerable insight into the human feasibility of such a program component.

In addition to generating information, on the basis of which an assessment of feasibility could be made, the study was expected to yield several substantive products. It sought to produce the following, which have wide application to teacher preparation programs in general:

1. A computerized management control system usable for total program management as well as for simulation. This includes (a) an instructional management system with appropriate specifications of hardware-software alternatives, and (b) a model fiscal management system applying standard cost accounting procedures, flexible budgeting and concepts from PPBS to teacher training systems.
2. A description of a prototype for developing curriculum, materials and instructional procedures to performance specifications.
3. A description of the parameters of faculty development.

4. A description of the parameters of inter-institutional network coordination and cooperation.

The alternative procedures implemented throughout the feasibility study enabled the development of these products. They are described in the following chapters. In anticipation of the conclusions to follow, the procedures actually utilized in the conduct of the study enable a realistic response to the problem under consideration, i.e., feasibility of implementing the F.S.U. Phase I Model.

Chapter II presents a conceptual extension of Phase I specifications to an implementable instructional model. This model was utilized as a theoretical basis for developing and implementing with trainees a prototype of the model curriculum. This prototype is described in Chapter III.

The total management system is described in Chapter IV. The rationale for management techniques, the procedures utilized, detailed descriptions of instructional management and costing systems, and findings based on the prototype field tests are reported.

Chapters V and VI deal with inter-institutional collaboration and faculty development, respectively. Chapter VII describes start-up requirements and projections of cooperating capabilities and requirements. Chapter VII also concludes with a section which deals with feasibility under the heading of "Constraints."

This volume concludes with an appendix which serves to include a variety of items important to the understanding of this report. Of particular significance among these items is a position paper on the rationale for fiscal management which becomes the basis for actual implementation of Phase I model specifications. In addition, much actual data from prototype operations is included to supplement descriptions in narrative chapters. Of importance to readers particularly interested in the management system, the appendix includes samples of the many printouts available from the computerized management systems developed.

CHAPTER II

THE INSTRUCTIONAL MODEL

In certain respects, the end of the design phase and the beginning of a feasibility testing phase of the model project is not marked by sharp cessation of design and abrupt beginning of testing. Many aspects of the FSU Phase I Model needed further design and development before the program model could be implemented or, for that matter, before it could be subjected to a study of feasibility. Of concern in this chapter is the specification of an instructional model designed to facilitate implementation of the FSU Model specifications, while at the same time providing a pedagogical scheme for the organization of the many behavioral objectives specified in the Phase I document. This chapter, then, can be seen as a necessary extension of Phase I design without which the determination of feasibility is impossible.

The instructional model outlined in this chapter has its theoretical roots in the FSU Phase I Model. The following statements constitute a summary of major characteristics of the FSU Model:

1. Preparation for teaching is viewed as a series of learning experiences designed specifically to enable trainees to meet stated performance criteria. The usual course format for professional training is rejected as inappropriate for providing experience to trainees.

2. Trainees should move from one experience or set of experiences to the next as they demonstrate ability to meet performance criteria. This means that performance rates should be individualized, not group-based.

3. Provision should be made throughout the program for immediate application of theoretical ideas about teaching to the act of teaching itself.

4. Trainee progress must be carefully monitored and recorded to make possible the operation of an instructional program tailored to diagnosed needs and learning styles of individual trainees.

It is also necessary to provide trainee performance information for regular program revision. A computerized management control system is specified to facilitate this criterion.

Several additional requirements for an instructional model emerge from a careful reading of the Phase I document:

1. Trainees should become actively involved in the act of teaching early in their pre-professional training. This involvement should be continuous throughout the entire pre-professional phase of the program and should progressively approximate the full range of anticipated teaching performance.
2. Multiple paths to learning must be provided to accommodate trainee differences in levels of commitment, interests, effective rates of performance, acquisition of knowledge, and styles of learning.
3. For somewhat the same set of reasons as included in number 2, and because of the desirability of creating an attitudinal set which would enhance maximum trainee determination of personal goals and learning experiences, it is necessary to create an instructional scheme which would provide trainees with a maximum freedom of instructional choice at all levels.

Instructional Models

The above lists of major characteristics of the FSU Model can be considered together as a set of criteria on the basis of which an instructional or pedagogical model can be built. An instructional model is here defined as a theoretical paradigm which interrelates basic elements which must be provided if a learner is to have maximum opportunity to achieve instructional objectives. The analysis and proposal which follows assumes that instructional practices are generalizable in that they all attempt to provide a learner with awareness, knowledge and opportunities for action and feedback.

A Traditional Model

The rationale on which the proposed instructional model is based can best be understood by contrast with other generalized models. In a "traditional model" students have been expected to acquire first an awareness of, and then cognitive knowledge or comprehension of, theories underlying the processes of education and of methods frequently or typically utilized to accomplish educational aims. This is then typically followed by relatively unstructured teaching activities intended to provide an opportunity for a trainee to try out theories learned.

This basically logical scheme for organizing instruction seems to follow well a basic learning cycle, but would appear to have serious weaknesses on at least two counts gleaned from psychological literature on learning. Motivation and transfer are two elements which must be dealt with in attempting to evoke and to make maximally useful any complex type of learning. The extent to which an individual student or trainee is motivated to set and to pursue intermediary learning goals is directly related to his perception of the relevance of the intermediary expectancies to his perceived long-range goal, i.e., becoming a professional elementary school teacher. The type of cognitive learning expectancies which have so typically permeated lecture-dominated professional education courses for many years are often exceedingly difficult for trainees and instructors alike to perceive as having relevance to the later performance of teaching acts. Thus, the logical basis of traditional instructional models often fails to stimulate the trainee to high levels of motivation in the pursuit of step-by-step objectives which bear only a "later-to-be-tried" relationship to the overall professional goal of teaching.

The extent to which this "learn now-try later" instructional model yields significant transfer to practice in teaching has long been in doubt. The assumption that knowledge about teaching is transferrable in any significant way to actual teaching itself is questioned by researcher and beginning teacher alike. The provision of opportunities for action or practice is disjunctive under this traditional model. With instruction organized basically around knowledge, which often is only vaguely related to teaching itself, the learning cycle is often broken by long periods of time before attempts can be made by the learner to utilize this knowledge in a field situation. Consequently, an instructional model which organizes around and emphasizes knowledge may contribute only minimally to the ultimate program goal of teaching competence.

A Contemporary Model

In recent years, some teacher training programs have utilized what might be characterized as an "analytical" model for instruction. In such programs the trainee is taught early in his professional coursework to utilize a variety of observational instruments to gain an early awareness of the field of teaching as it exists. He is helped to analyze this field and, on the basis of this analysis, to organize those things he must learn in order to teach. Thus, he pursues knowledge about teaching, but that pursuit is very different from the traditional model in that he is now applying a knowledge of theory and method to the perceptual field as he has organized it. The emphasis of such programs tends to be on vicarious experience, i.e., observation of live classrooms, videotapes, films and written vignettes. Because of an early opportunity to observe and analyze real teaching, a task very relevant to a trainee's ultimate performance goal, a chance for high trainee motivational levels is greatly enhanced by this model. It remains, however, disjunctive in that the trainee must transfer at a later time his knowledge about teaching to actual performance of teaching.

The Proposed Instructional Model

The instructional model described in the next several paragraphs would appear not only to meet well the program criteria listed in this chapter, but also to accommodate neatly the considerations of immediacy as regards high motivational level for engaged trainees. Although definitive research evidence does not exist to support its superiority in the realm of transfer, its design supports an obvious hypothesis that proficiency in an act of teaching itself is more directly transferrable to on-the-job teaching than is knowledge about teaching.

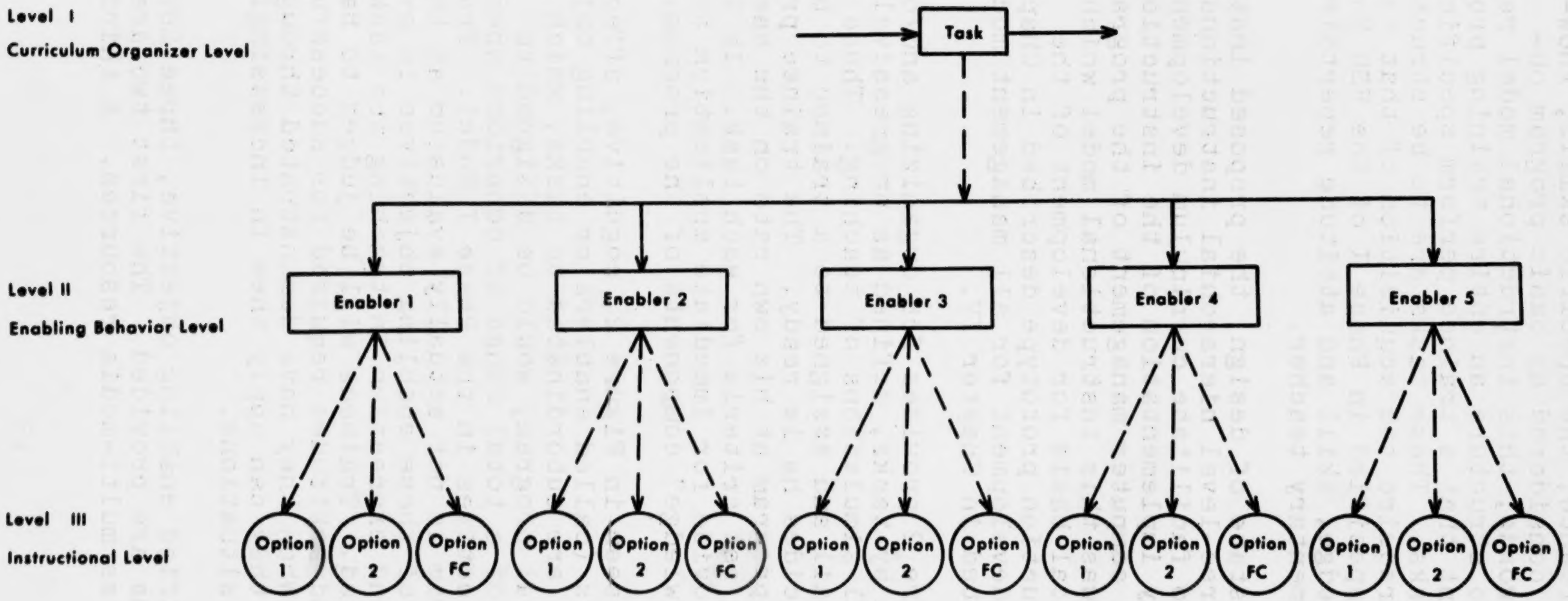
In the most general of terms, the proposed model provides an alternative to more widely used traditional and contemporary approaches to organizing training curricula. It places a priority on creating a reality-based situational demand on the learner which requires for successful performance, the specific skills, knowledges and attitudes considered as basic program objectives. In other words, this instructional model represents an attempt to structure an entire training program around the requirement that a trainee perform specific assigned teaching tasks. These tasks are to be structured in such a way as to require the acquisition of that total set of behaviors as specified in Phase I of the FSU Model as comprising the knowledge, skill and attitude repertoire of the professional elementary teacher.

In its present state of design, the proposed instructional model is a three-level hierarchial instructional framework designed to facilitate curriculum development processes, day-to-day implementation of the instructional program, and overall computer management of the program (See Figure 2). It was this instructional model which served as a theoretical basis for development of the curriculum and instruction prototype described in Chapter III, as well as for development for all management model prototypes as described in Chapter IV.

Level I in Figure 2 provides for organizing and/or sequencing a program by tasks, defined as progressively more complex and real simulations of teaching. These tasks are described in detail and assigned to a trainee to be attempted when he decides he is ready. The trainee progresses through the program at his own rate on the basis of successfully meeting set criteria for each task. It is these tasks which provide for immediate application to practice of the "knowledge" components of the program.

At Level II as seen in Figure 2, cognitive, affective and skills objectives (called enablers or enabling objectives in this model) are subordinated to tasks, which when considered for a total program, would be designed to require utilization of a total range of behaviors specified as enabling objectives in the Phase I Model. Trainee success in the program is not actually evaluated at this level. Acquisition of these enabling objectives is evaluated only as they find expression in teaching the tasks to which they are related. Trainees will be judged to have the concepts, skills, and attitudes required for successful elementary teaching when they have demonstrated through teaching tasks that they can apply them in increasingly complex and diverse situations.

For each identified enabling objective, three Level III instructional options are provided. The first two are generally conceived of as multi-media resources. A third


Level I
Curriculum Organizer Level
Task
Level II
Enabling Behavior Level
Enabler 1
Enabler 2
Enabler 3
Enabler 4
Enabler 5
Level III
Instructional Level
Option 1
Option 2
Option FC

BASIC INSTRUCTIONAL MODEL

FIGURE 2

instructional option provides the trainee with a completely free and personalized choice of learning activity. Self-assessment instruments provide feedback to the trainees, and when entered into the instructional management system, provide for program evaluation and revision.

An analysis of the model briefly described above, and a careful examination of the ideas embodied in each level of this model, are necessary to understand the range of alternative uses to which it might be put. That it serves as a curriculum organizing scheme is readily apparent from the levels of its components. But to grasp its significance as a framework within which to conduct and to manage instruction requires explication beyond labels. Each level of the instructional model and the interrelationships between them must be examined in order to evaluate the proposed instructional model in terms of criteria based on characteristics of the FSU Phase I Model.

Level I - Tasks. Level I tasks might well have been defined as any major course or program objectives, with subsequent levels of the instructional model reflecting those behaviors prerequisite to the attainment of major objectives and the necessary instructional experiences predicted to assist a learner in achieving them. While the hierarchical scheme described in the above paragraphs and in Figure 2 could be used in this way, as such it would be more an implementation of the traditional instructional model than it would that which is now being proposed. In the proposed instructional model, Level I tasks are intended to be teaching performances which serve both to organize objectives of the training program and to provide an opportunity for "knowledge about teaching" to be applied in a reality-like situation.

If it may be assumed that that set of knowledges, skills and attitudes listed in the Phase I Model document are behavior expectancies necessary to the performance of so-called professional teaching, there is still then the necessity to integrate these behaviors into a training program which at least simulates the parameters of a real life instructional situation. More importantly from a development standpoint, it is necessary to bring some kind of organization to those behavior expectancies which, when clustered together, constitute a grouping of instructional objectives appropriate to the criteria discussed earlier This is particularly relevant to those considerations of motivation and transfer gleaned from psychological learning theory which underlies the development of this program in the first place.

If we further assume that a certain validation of behavior expectancies is desirable and possible by relating these behaviors to performance of some specific aspect of real teaching, then it would seem highly desirable for the curriculum organizing scheme to be tied directly to actual performance of teaching. It was with this latter assumption in mind, and looking to the criteria discussed in earlier paragraphs, that "teaching tasks" were specified to serve as curriculum organizers.

A "teaching task" is defined as a set of performance expectancies which, when met by a trainee, constitutes an approximation of some composite aspect of real teaching. Tasks in early stages of a program would be of short duration, highly structured, and simulated rather than real. For trainees reaching later stages of their programs, tasks could be exceedingly complex, requiring performance over a period of time, under varying sets of conditions, and structured in real teaching settings. The most crucial and yet creative curriculum development job under this scheme is the specification of significant tasks which meet the criteria suggested above, and which provide for reasonable inclusion and organization of that total set of behaviors deemed as constituting professional teaching competence.

If, as indicated in the FSU Phase I Model, teaching can be considered as the appropriate integration of the five behaviors as reviewed on pages two and three of this report, then it is reasoned that each task used as an assignment to trainees must include most, if not all five, behaviors in some form and at some level. If we further assume that tasks will be assigned to beginning trainees presumed to have minimal competence in the five behaviors as well as to persons nearing professional certification, then tasks themselves must vary in terms of complexity and in terms of the level of expectancy for trainee performance.

Complexity of the task itself could vary along several dimensions, among which are (1) the number and characteristics of pupils taught, (2) the complexity of objectives for pupil achievement, (3) the nature of the content, and (4) the range of teaching behaviors required for successful performance. In varying the expectancy for trainee performance, high structure can be provided for simple tasks and low structure for difficult tasks. For example, high structure for simple tasks could be attained by specifying for trainees objectives to be achieved with pupils, the content and materials to be used, and restricting the trainee to choice of a small number of alternative strategies of instruction. On the other hand, low structure for difficult tasks would carry with it a very general task expectancy so that the trainee would be responsible for making all decisions about specific objectives, materials, strategies to be followed, and techniques of evaluating the instruction. For trainee performance evaluation on simple tasks, only his exhibition of criterion behaviors need be evaluated. In performing complex tasks near the end of his program, however, a trainee could be judged not only on the basis of demonstrated skill and choice of alternatives appropriate to the situation, but also in terms of pupil achievement of his teaching objectives. Such tasks would serve not only as a vehicle around which to organize objectives and instruction, but they would also provide immediate performance goals for trainees, who would then be motivated to pursue the instructional options which would enable them to successfully perform the tasks assigned. "Knowledge for teaching" would now become enabling in the sense that trainees must utilize it immediately to successfully perform tasks. Since the tasks are designed to be reality based simulations of teaching, it is reasonable to hypothesize that knowledge, skills and attitudes thus put to practice would yield maximum transferability to full-time professional teaching performances.

Level II - Enablers. Based on the Phase I study, an extensive array of behavioral objectives are specified as a product of that study. Although the array is incomplete, it represents a first generation attempt to specify the universe of behavior expectancies for professional elementary teaching. It is based on comprehensive analyses of teaching behaviors. These behavioral objectives are dealt with as enabling behaviors, and are referred to here as Level II of the proposed instructional model.

This second level of the instructional model is to be utilized for clustering behavioral objectives. These are to be organized in such a way that they serve to enable the performance of the "teaching tasks" of Level I. It should be recalled here that the Level I tasks constitute organizers and opportunities for immediate performance of composite aspects of teaching. Thus, it is possible to consider those behavior objectives included at Level II of the model as program objectives if one wishes to specify the behavioral outcomes of this program.

Just as tasks are to vary from simple to complex, so must the enabling behaviors vary. An example might be the development of the ability to construct a complete lesson choosing a relevant instructional objective for a lesson from a list of objectives, a task which would require relatively low levels of cognitive and skill behaviors. In intermediate level tasks, a trainee might be required to write instructional objectives for the lesson he is to present and to choose adequate teaching strategies from a list provided to match his objectives. Still later tasks could require the trainee to both write the lesson objectives and to design the accompanying teaching strategy. The most complex of tasks, then, could require a complete design of the entire lesson by the trainees as well as the teaching of the lesson and the evaluation of pupil outcomes. Thus, as the tasks grow in complexity, so must the level of enabling behavior grow in complexity. As tasks become more difficult, enabling behaviors on a cognitive level should move from knowledge toward comprehension, application and synthesis. Likewise, in the skills domain, difficult tasks would require for successful performance the acquisition and demonstration of highly complex and interrelated skills.

Level III - Instruction. In as much as Levels I and II of the proposed instructional model are being utilized for curriculum organization and specification of behavioral objectives, it becomes necessary to utilize a third level as a framework for the instructional program itself. It is this level at which the trainee encounters information and experiences designed to help him achieve the behavioral objectives categorized as enablers. By design, the instructional model must provide multiple pathways for a trainee individually and at his own pace to achieve specified objectives. These pathways or segments of instruction are referred to hereafter as instructional options.

Instructional options, provided specifically to aid the trainee in achieving competence in the enabling behaviors, are selected and designed on the basis of a Gagné-Briggs instructional development scheme (i.e., the type of learning called for by the enabling objective is carefully analyzed, and multi-media resources are specified which have the greatest likelihood of producing the desired learning).[1,2] The rationale for a multi-media based program is carefully developed in Volume I of the F.S.U. Phase I Report.

A decision to limit the number of instructional options for each enabler was an arbitrary one. The number chosen was believed to be small enough to facilitate program management from an administrative viewpoint and large enough to insure instructional flexibility. A single instructional possibility would not adequately provide for individual learning differences and would reduce the availability of self-directed learning on the part of a trainee. For every enabling objective, two instructional options should be developed according to the development scheme described above. These two options should probably be mutually exclusive and independent of each other with either option providing the trainee with ample opportunity to become proficient in the enabler. This would not, however, rule out the opportunity for a trainee to avail himself of both prepared instructional options. A third option is always considered a free choice option. This free choice would permit a trainee to elect any instruction he wishes to help him undergo any type of formal or informal instruction. It is also possible under the free choice option to seek a proficiency test on the particular enabling behavior for either diagnostic purposes or to assist him in making his own decision to perform the task assigned.

The opportunity to choose a free option permits a trainee maximum control of his learning experiences. In this way, he is theoretically not bound by previously determined and possibly limited modes of instruction. Actually, the element of choice by the trainee as a means of controlling his own learning experience is greatly enhanced at all levels of the instructional model, particularly when viewed as a framework within which the trainee moves through his program (see Figure 3). From Figure 3 it can be seen that choice by the trainee, either made independently or with the assistance of a faculty counselor, is possible at almost all points in the program.

Performance Evaluation

It should be noted here, again referring to Figure 3 as well as to Figure 4, that the instructional model calls for the trainee to be evaluated on the basis of task performance only. An assumption is made here that if task design and the subsequent clustering of objectives to enable performance of tasks are all congruent, successful task performance is a valid indicator of a trainee's acquisition of the several enabling objectives. It is also further assumed that tasks can be sequenced so that they

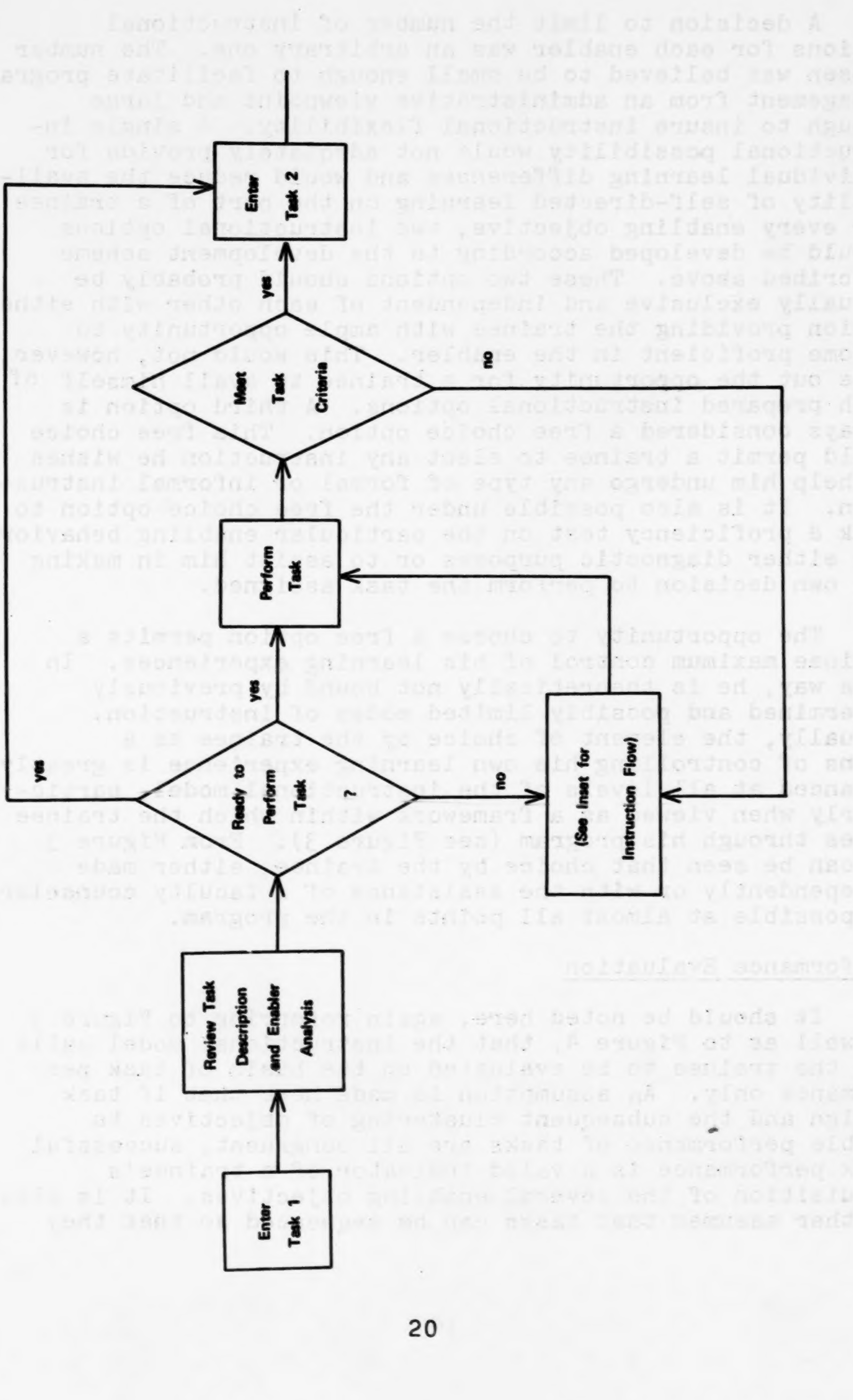
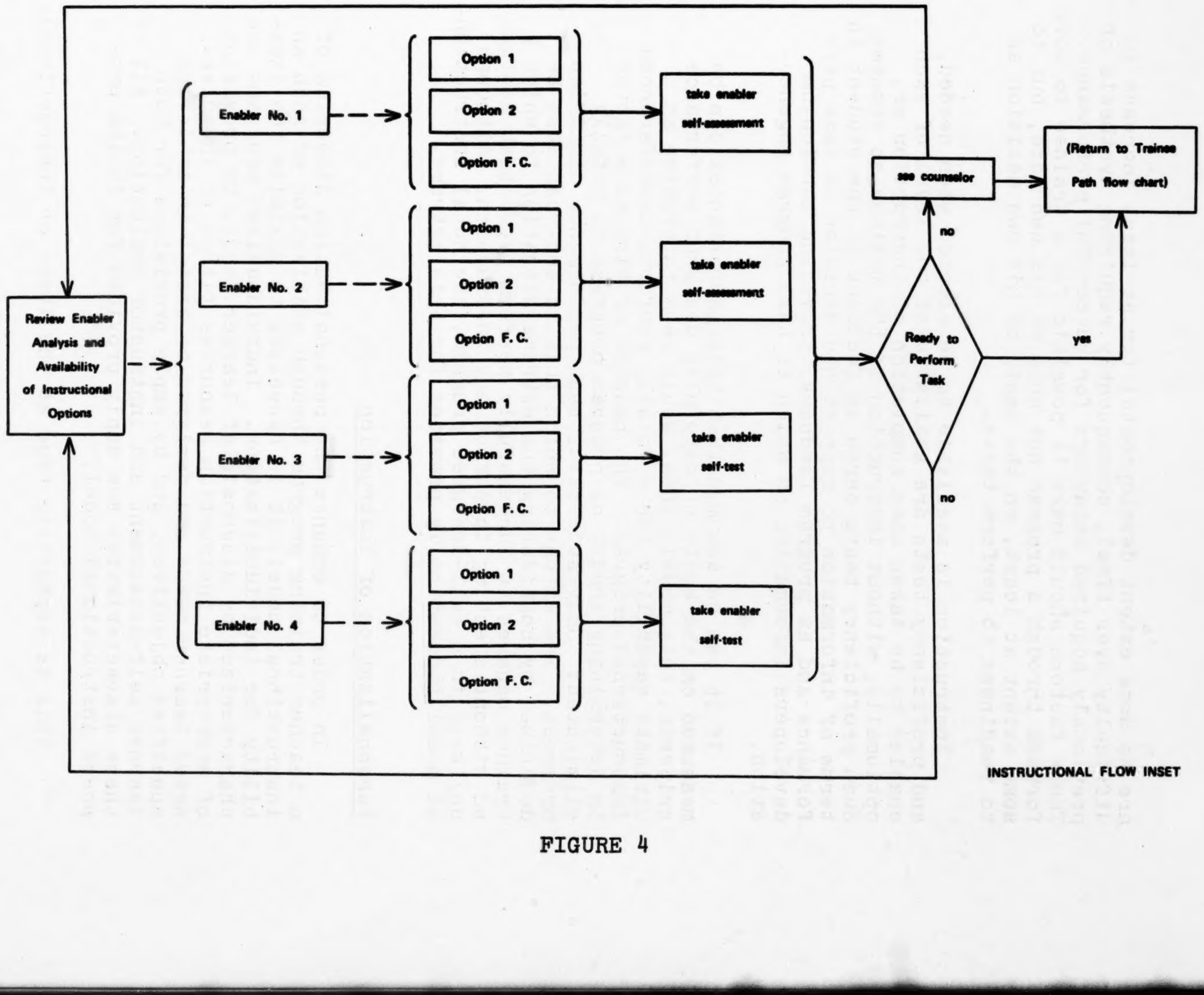

Enter Task 1
Review Task Description and Enabler Analysis
Ready to Perform Task ?
yes
yes
no
(See Inset for Instruction Flow)
Perform Task
Meet Task Criteria
no
yes
Enter Task 2

FIGURE 3

TRAINEE PATH THROUGH TASKS


Review Enabler Analysis and Availability of Instructional Options
Enabler No. 1
Enabler No. 2
Enabler No. 3
Enabler No. 4
Option 1
Option 2
Option F. C.
take enabler self-assessment
take enabler self-test
Ready to Perform Task
yes
no
see counselor
(Return to Trainee Path flow chart)

INSTRUCTIONAL FLOW INSET

FIGURE 4

are to some extent developmental (or at least increase in difficulty over time), consequently requiring synthesis of previously acquired behaviors for successful performance. These factors should make it possible for a trainee to move forward through a program not only at his own pace, but to some extent at least, on the basis of his own decision as to readiness to perform tasks.

Instruction is available to be elected when needed, and proficiency tests are available at the level of each enabler to be taken upon completion of instruction or, optionally, without instruction if the trainee so chooses. Such proficiency tests serve as feedback to the student in terms of information to support his decision on task performance and as program feedback, providing curriculum developers information on which to base program regeneration.

If it can be assumed that task performances can be measured on the basis of carefully designed performance criteria, this model, then, would seem to provide an ultimate capability for a totally performance-referenced instructional program. The passage of time as a factor in determining credit or program progress is totally eliminated. Only successful task performance signifies progress. The extent to which this is true can best be described by considering the extreme situation in which a trainee manages to successfully perform every task assigned without electing to pursue any instruction. Although unlikely in a well-designed program, the total instructional model theoretically provides for this extreme.

Personalization of Instruction

In order to enhance the personalization dimension of a teacher training program through utilization of such an instructional model, it is necessary to maximize the capability for individualization. Individualized programs are characterized by diagnosis of learner needs, by provision of appropriate instruction resources fitted to the diagnosed learner needs and designed to assist in achieving specified objectives, and by ample provisions for both learner self-assessment and instructor evaluation. All of these characteristics are amply provided for in the proposed instructional model.

This is especially true at the level of instructional options. These should and can be to a great extent self-contained. This means that an instructional option should be a complete instructional package providing, through a particular media or combination of media, the resources necessary to achieve a particular objective. These should be available at any time to individual trainees for their use for as often or as long as needed. Their use should be dependent upon trainee demand and not upon a pre-scheduled sequence of instruction for a group of students. One exception to this would be the extent to which certain instructional options need to be a small group seminar led by a faculty instructor. Since a small group of trainees would need to work together here, some minimal lead time in scheduling space and instructor time would be necessary. The availability, however, of such an option would still be dependent upon trainee demand.

Instructional Management

Since the FSU Phase I Model specifies that it must be usable for programs which enroll large numbers of teacher trainees, and with the anticipation of operating a highly individualized program of studies with maximum trainee choice at all levels, it is clearly a system requirement that the instructional program be manageable via some mechanized means. Present day computers are amply suitable for this task, and the proposed instructional model is one which lends itself with a minimum of complexity to computerized management.

Specifications for a computerized management system based on this instructional model call for the system to do the following :

1. It must accept in a data file, formatted much like the basic model diagram in Figure 2, the instructional program as it is designed. This includes verbal description of tasks, a listing of prerequisite enablers, and a specification of available options coded according to the particular media utilized.

2. It must be capable of accepting in a second data file information about each trainee in the program. This information would include antecedent data such as scores, sex, schools attended, and the like. Over a period of time, this file would also be called upon as effectiveness

ratings, follow-up reactions by trainees, positions held and further degrees.

3. It must be capable of storing information relative to a trainee's performance throughout the entire program. In this respect, it must be capable of accepting directly from trainees information relative to the instructional options pursued and performance on enablers. It must also accept a record of task performance directly from program evaluators. This information would be formatted according to the framework established in the curriculum data file.

4. The system must also accept into a fourth data file information relative to all factors bearing crossed relationships to any aspect of the instructional program.

5. The operation of such a system must provide for both day-to-day management of the instructional program and for longitudinal management of the program budgeting. The day-to-day capability would need to provide up-to-date information on trainee performance for use by the trainee and for counseling purposes. It would also need to provide day-to-day capabilities of resource allocation and scheduling.

Design of the instructional model described in the paragraphs above, and further specifications of a computerized management system based upon that model, were necessary and logical extensions of the F.S.U. Phase I Model specifications. In succeeding chapters of this document, a prototype implementation of this model will be described. Documentation of the procedures followed, a description of the actual implementation and examples of first generation products which it produced in terms of instructional materials, computerized management control system and training procedures are included.

Data gathered in the process of developing and implementing this prototype serve as basic sources of information upon which feasibility determinations are made.

CHAPTER III

CURRICULUM AND INSTRUCTION PROTOTYPE

The Florida State University Phase I Model makes many assumptions about learning and teacher education which must be carefully examined before such a model can be implemented on a large scale. Certain of these assumptions were examined by planning, carrying out, and evaluating a small, three-week teacher education program referred to herein as a prototype of the FSU Model. This prototype incorporates several of the more important features of the larger instructional model. Trying out this prototype, it was hoped, would furnish data needed for feasibility projections as well as would point up the more obvious pitfalls and limitations of the development of the larger design.

Described in this chapter is the curriculum and instruction prototype. It was intended to be a small scale implementation of design characteristics as specified in the Phase I Model and as extended in Chapter II of this report.

A group of curriculum developers worked throughout the summer of 1969 to convert the theoretical design characteristics into an implementable curriculum for try-out with actual teacher trainees. The makeup of the group composed to develop this prototype was unusual. Following a direction set in the Phase I study when an interdisciplinary and inter-institutional group collaborated to conceptualize the overall FSU program model, this team included education faculty, graduate and undergraduate students, and public school personnel. Specifically there were three Department of Elementary Education faculty members, four graduate students drawn from the Departments of Elementary Education, Research and Testing, and Administration, two undergraduates in elementary education and two elementary curriculum persons from the local school district.

Because no guideline for such development activity existed, nor was systematic instructional design a major competency of any of the developers, development progress was painfully slow. However, the activity finally yielded a curriculum with all necessary procedural aspects, instructional materials, and evaluation instruments to carry out a field trial of the prototype in the fall of 1969.

The actual field trial utilized 19 teacher education students drawn at random from a regular year block experience in elementary education. Because of normal scheduling of block classes, it was possible for these students to devote a major, uninterrupted period of their class and study time to participation in the prototype. Freed of almost all course requirements during this period of time, the students involved as trainees in this prototype could literally avail themselves of its opportunities from early morning until late in the evening if they so desired. In fact, the prototype facilities were open throughout the day and the evening, and a differentiated staff of faculty and paraprofessionals were available to trainees throughout that time.

In the sections which follow, a careful description is provided of the prototype curriculum, of the trainees who participated, of the elementary school pupils who served as training subjects, and of the facilities, materials and staff needed to carry out the field trial. It is helpful to refer back to the instructional model described in Chapter II, since the prototype curriculum is built within that framework. It is also useful to know that the management systems described in Chapter IV were utilized to support implementation of this prototype. Data accumulated in terms of trainee performance while progressing through this prototype curriculum, on costs incurred, and on human problems encountered, form the basic data upon which projections were made in Chapter VII as to the feasibility of full-scale implementation of the F.S.U. program model.

Nature of the Curriculum

Subject matter was not the major determinant in curriculum design since it was recognized that the prototype represented only a small segment of what might eventually be a total model curriculum. Therefore, prototype objectives tended to represent "model" rather than "content" objectives. However, consistent with the basic theory of the full model, it was designed to provide (1) self-paced experiences, (2) criterion referenced performances, (3) sequenced theory-practice contiguity, and (4) progressive synthesis experience.

Teaching Tasks

As is conceptualized in Chapter II, teaching tasks served the purpose of curriculum organizers. The prototype tasks were designed in two sets of five tasks each. The first set dealt primarily with skills development in the language arts. Five separate tasks were developed. The second set of teaching tasks dealt primarily with concept development, and again, five different tasks were developed (See Appendix A).

The first task set concentrated on the development of pupil skills in the area of listening for at least two reasons. Listening tasks can be readily designed with a delineation between tasks. Also, the first task in the set could be quite simple in design, whereas the fifth task could be much more complex. This increasing complexity was evident on several levels, i.e., the nature of the lesson became more complex and the activities for which the trainees were responsible increased both in number and in complexity. This same simple to complex progression was observed in the development of concept tasks in the second set.

Consistent with the theoretical construct described in Chapter II, the sequencing followed the technique of giving a trainee a great deal of support in his first experiences before a group of children, and gradually withdrawing these "props" as he gathered experience and confidence. Also, the trainee was not required to follow a task-by-task linear sequencing through these tasks sets. He could elect to bypass a task he felt he did not need to perform. For example, tasks one and two in the listening set provided essentially the same experience for the trainee. He could elect both tasks to increase his confidence and to gain further practice, or elect to do only one.

Development of Enabling Objectives

Once a decision was reached on the domain of the two task sets, each task was then designed so that its performance would require competence in a specific set of enabling behaviors. For example, if the teaching task were that the trainee was to elicit from pupils ideas and words associated with the concept, then the prerequisite to that task would include a basic knowledge of the nature of concepts, a knowledge of basic classroom questioning techniques, beginning level skill in using questions in the classroom, and knowledge and skill in managing the age group being taught. Each teaching task was fitted with a range of prerequisites which, because they enable the trainee to perform the teaching task, were designated as enabling behaviors.

As with the teaching tasks, all enablers were not required of all trainees. Depending on such matters as previous experience or knowledge, an individual trainee, with the aid of a counselor, might elect all, none or some of these enablers. By providing for individual differences, maximum flexibility at the enabling behavior level is assured. Thus, a unique feature of the preservice education program, that of self-paced experiences, was designed as an integral part of the prototype operation.

These enabling behaviors, due to their very nature, were written in performance terms as behavioral objectives for the trainee. Two examples might serve to demonstrate this. One relatively simple enabler used in the prototype was ; "The trainee will be able to identify the characteristics and purposes of good questioning techniques." This basic knowledge objective is seen as a prerequisite behavior-enabling performance of a teaching task. Another and somewhat more complex example was ; "The trainee will be able to develop four similarities and four differences between two related concepts." This objective, listed to enable performance of task nine in the prototype, implies a basic knowledge of concept development and concept characteristics.

Constructing prerequisities as enabling behaviors in performance terms requires that an accompanying measure of evaluation be employed. Thus, tasks were developed and a scoring system related to enabler acquisition was developed. The tasks were of a kind that could be self-administered by the trainee. Some were paper and pencil instruments; some were taken via the computer utilizing the teletype terminal. These enabler evaluations were reported on a scale indicating to the trainee his achievement at this level. The scoring, ranging from 0-99, was intended to be interpreted as follows:

80-99	Indicated good enabler acquisition.
60-79	Indicated fair enabler acquisition.
50-59	Indicated below average enabler acquisition and required additional study.
0-49	Indicated poor enabler acquisition and the trainee was advised to see his counselor for recommendations for further study.

Development of Instructional Options

In order for the trainees to become competent in the enablers, instructional options for each enabler were provided. These instructional options were designed as multi-media resources which trainees could utilize for assistance in acquiring enabling behaviors.

Each enabler was fitted with three instructional options, one of which was a free choice option. This arrangement permitted a wide lattitude in choice of instructional materials without over-loading the prototype management capability. The free choice option would permit the trainee to elect any instruction he felt would help him acquire competency in the enabler, or elect not to undergo any type of formal or informal instruction. Under the latter circumstances, he would then merely take the enabler proficiency test when he felt ready to do so.

Instructional materials used at the option level were both developed by the staff and obtained from commercial sources. Because development and production time was limited, many of the materials were of a traditional nature, particularly those which were taken from already available commercial sources.

The type of materials used in instructional options can be categorized in two ways, the first of which refers to the format of materials. Two basic formats were typically used; materials in print format and materials in audiovisual format. Option materials can also be categorized in terms of those materials secured from commercial sources and those developed by the project staff.

Print format materials most frequently included chapters from books and copies of journal articles. These sources were usually related to the knowledge-concept objectives, and presented background material in more depth than is often done with other types of media. Several enabler-specific pieces of written material were also developed by the project staff to more carefully tailor information to the needs of trainees.

Audiovisual materials from commercial sources included primarily filmstrips and tape recordings or packages utilizing the two together. These were often used to develop certain skills related to teaching, such as the writing of behavioral objectives. Where several tasks required trainees to acquire certain types of information about concepts, this information was provided through the use of several sixteen millimeter films on concept-related topics. Audiovisual materials produced by the project staff were produced using one-half inch video tape equipment. A fairly significant number of brief instructional video tapes were developed primarily to present demonstrations and observations of children of different ages.

Informal reaction by trainees to the instructional options available to them, as well as an analysis of the resources used, based on data in the management system files, support a conclusion that materials developed by the project staff which were enabler specific were by far the most used and productive of the instructional options. For reasons which are probably obvious, the video tapes were the most popular medium used. In reality, these video tapes proved not only to be popular with trainees, but provided a relatively simple means of producing audio-visual instructional resources to specifications without securing the services of professional producers. Project staff members often used small groups of public school pupils to make brief video tapes. Also, excerpts were taken from previously taped materials of ongoing instructional programs, making it relatively easy to build composite instructional tapes by dubbing from one video recorder to another. Materials developed this way for the small prototype operation might well, in larger programs, be developed professionally and kinescoped to become film loops or other types of audiovisual media because of more permanent and simple utilization factors.

Trainees and Pupils Taught

In order to field test prototype curriculum, it was necessary to select a sample of students whose participation as trainees for the three weeks of the prototype would be reasonably representative of that population of undergraduates pursuing elementary teacher education at Florida State University. Also, because the instructional model demands frequent performance of assigned teaching tasks, it was necessary to provide them with a readily accessible elementary school pupil population. The following paragraphs describe these two groups.

Trainees

At Florida State University in the ongoing elementary teacher preparation program, the majority of professional coursework is concentrated in the final three or four quarters of a student's total university program. Early in this professional work is a block sequence in which a student has his total enrollment in elementary education courses. It was decided to use students in the first of these blocks for two reasons: (1) they would have had very little experience in professional education and with children, and (2) they could be freed from course responsibilities without major interruptions for an extensive time to participate in the prototype.

Pupil Subjects

A crucial requirement of the instructional model is the ready availability of pupils whenever a trainee is ready to perform on a task. The logistics of this requirement posed a very real challenge to the prototype operations. Put succinctly, should trainees go to pupils in the field or should pupils be brought to campus for use as training subjects? In a very real sense, as long as tasks are of short duration and do not demand continued utilization of the same group of pupils for any extended time, it is highly desirable to bring them to campus. If this can be done without adversely affecting the regular learning experiences of the child, maximum control over the training situation can be most efficiently obtained this way. Task specifications, evaluation, appropriate mix of pupil population, time and other factors can be tightly controlled as if in a research setting. Since all task performances must be monitored by an evaluator as well as video tape, many factors are weighted in favor of bringing pupils to the campus. Therefore, it was arranged to use pupils from a public elementary school within reasonable proximity of the campus and, to a limited extent, to use pupils from the university school which was immediately adjacent to the training center where the tasks were performed.

Although in any final operational form, careful selection of pupil subjects on the basis of a number of variables such as socio-economic background, ability characteristics, and the like will be both possible and desirable, it was decided to make no such selections during the prototype operation. In fact, all of the children in grades one through five (the upper limit) at the public school participated in the project. Pupils were made available in complete class groups and were brought to the project site with their teachers. For pupils the participation qualified as a field trip and parents were so informed in accordance with school policy.

At the initial presentation of the project to the public school which agreed to furnish pupils for subjects, faculty response was enthusiastic and this enthusiasm continued throughout the prototype. The actual drawing up of a schedule of participation was left to school administrative personnel. Transportation was planned by arranging for the use of a public school bus during off hours. The driver brought pupils to the training center in the morning as soon as they were ready at the school and returned them to the school in time for lunch. A second group of pupils was brought to the training center after lunch each day and returned to the school prior to time for dismissal.

It was planned that each school class be used only once during the three-week period of the prototype. It was reasoned that having pupils out of class for no more than two to three hours in a three-week period would pose no great interference with the on-going program of the school. This was generally agreeable to principal and teachers alike. Teacher reaction was generally favorable to this kind of participation, the experience being seen by most as a useful change of pace for pupils and a valuable learning experience for themselves.

Given the requirement to use classes only once during the three-week period, the pupil population had to be supplemented to a degree. To make up classes needed, the FSU University School was called upon. This school is located immediately adjacent to the training center, and as only a few classes were to be used, scheduling was easily arranged and no transportation was involved.

In all, few problems were encountered in obtaining and dealing with pupils. With few exceptions, children and their teachers were cooperative and easy to work with. Administrators with whom the project staff dealt were helpful and contributed significantly to the success of the prototype venture. Arranging for transportation was neither difficult nor expensive.

Operational Procedures

Given what has been described to this point, certain facilities loom as requirements for the system to operate. Trainees must have a place in which they can come to understand the tasks they are to be held responsible for, to become aware of enabling objectives that are related to the tasks, and to undergo selected instructional options in relation to enablers. Since their study activities are more often than not pursued independently, this set of requirements was met in the prototype by using a facility referred to herein as a resource center. Additionally, trainees must have a place in which to perform on tasks, children must be held in readiness for training sessions, and evaluators and trainees must be able to engage in conferences focused on task accomplishment. This set of requirements was met during the prototype by utilizing a facility referred to herein as a training center.

The sections which follow describe the operation of these centers. These descriptions anticipate the following questions: (1) Where were they located? (2) How were the centers equipped? (3) What arrangement for staffing was used in these centers? (4) What would the trainee actually do in these centers? While these two centers housed the bulk of prototype operations, typical classrooms and faculty offices were also used in the prototype. Small seminars and counseling sessions were conducted in these spaces which need no description in this document.

Because of the importance of evaluation to the overall operating procedures of the instructional model, it is discussed in a separate section following resource and training center procedures.

Physical Facilities

The Resource Center. Two centers were used in the operation of the prototype. One was referred to as a resource center. This center was planned as a study center, as the location of the computer terminal, and as a location for scheduling all task performances.

Physically, the center was well suited to its purposes. It was located in a section of the education building used exclusively for elementary education independent study, and thus was already suitably set up and equipped for use as a prototype resource center. It was equipped with the following:

Facilities

1. Study tables; one 4' x 15' and two small semi-circular tables with chairs.
2. Three listening booths (a long table with accordion type divisions), each equipped with a console for tape listening.
3. Tables and chairs for the scheduler and the resource center librarian.
4. File cabinets for storage of software.

Hardware

1. One CAI teletype terminal.
2. One audio console with four tape decks.
3. One 16 mm. film projector.
4. Two tape recorders.
5. One record player.
6. One video tape player and TV monitor.

As the room was centrally located, it served as a general meeting place and center of operations. It was equipped with a telephone, and thus directly linked to the training center. The resource center housed all materials which were used with enablers and options, including: (1) files of lesson suggestions and additional references, (2) excerpts from library materials, (3) various tasks, and (4) films, filmstrips, audio tapes, and video tapes. This material was shelved and dispensed by the center librarian. It was readily available and met all student demands without time loss.

However, the center also had a card file listing supplementary materials for use as instructional options. The materials listed were generally central library titles and because they had not been placed on reserve, they often proved difficult to obtain.

The resource center was manned as described here. Two staff members were always on hand and there were often three or more. Staff members always on hand were the resource center scheduler and a materials librarian. The resource center scheduler was responsible for scheduling the time and location of task performances, and the librarian was responsible for checking out materials and for assisting trainees with any difficulties that they might have. For the prototype operation, the librarians used were particularly able to assist trainees in the use of materials inasmuch as they had been instrumental in the design of instructional options during the summer of development.

The center was in operation from 8 a.m. until 2:30 p.m. during each week day, and again from 7:30 until 10:00 p.m. each evening. The center was not open on Friday evenings nor on the weekend. Trainees generally tended to use the center most heavily immediately prior to their scheduled performance of tasks. This resulted in heavy utilization of the resource center on Mondays and particularly on the first several days of prototype operation. Based on headcounts of resource center usage by trainees at different times during the period it was actually open, it is reasonable to conclude that the resource center was used no more than to fifty percent of its capacity to handle trainees.

Scheduling activities which were conducted at the resource center were extremely important for the efficient utilization of the training center described in the following paragraphs. Trainees were encouraged to plan ahead and to schedule tasks as far in the future as they wished; however, trainees generally scheduled task trials on the day before they intended to do them. Schedules were transmitted to the training center daily and changes communicated via the scheduler by telephone. Throughout the prototype it was possible to schedule and even to reschedule tasks on an almost hour to hour basis. All changes, however, were initiated through the scheduler at the resource center in order to avoid confustion. (It should be noted here that manual scheduling procedures were efficient with 19 trainees, but in full operation the scheduling process would be computerized--see Chapter IV.)

The Training Center. Consideration of the procedures utilized in operation of the training center are discussed in three main categories. Facilities and procedures used in managing operation of the center are discussed, followed by a description of staff requirements. This is then amplified by a description of the way in which trainees used the center. Because suitable housing for the training center was not available in university owned buildings, arrangements were made with a nearby church to utilize their education facility for the training center. This church building was ideally situated in terms of location inasmuch as it was directly across the street from the university school and within walking distance of the education building where the resource center was housed. The physical layout within the facility was also excellent. A series of small 14" x 16' rooms were available along a single carpeted hallway. This hallway was joined by a large foyer which served the project as a lounge, meeting place and administrative headquarters. A very large classroom-sized space served as a holding station where elementary pupils were given supplementary instruction while awaiting use as training subjects. This place was well removed from those rooms being used for practice purposes.

Three of the small rooms were used as teaching stations where trainees met with four to six elementary school pupils to perform tasks assigned to them. Each room was supplied with a wall-mounted chalkboard, metal folding chairs, small tables, and such supplies as paper, pencils, crayons and chalk.

In each room a microphone was placed in a central location and a video camera was placed in a rear corner of the room (pre-angled and pre-focused). The video tape recorder and TV monitor were placed outside of the room on a moveable cart. The single microphone arrangement and wide-angle lenses on the video equipment proved to be very adequate in capturing good feedback pictures and sound of the task performances. Based on the experiences of the first week's operation, it was possible to re-position the trainees and pupils they were teaching in such a way that the single camera operation could capture not only the teacher and his performance, but at least some of the faces of children being taught. The latter arrangements also eliminated one major drawback which occurred as video taping began during the first week: trainees as first positioned for carrying out their teaching performances faced directly into the camera. With modification, it was possible to get a profile view of the teacher in action while eliminating the nervousness which trainees attributed to having to look directly into the camera. The final arrangements were quite satisfactory.

The three teaching stations were adjacent to one another. This created a noise problem when two or more were in use at the same time. The distraction was caused not so much by sound emanating directly from task performances, but rather from the sound of several evaluators or TV monitors operating in the halls outside of the teaching stations. Much of this problem was eliminated by posing restrictions on conversation and deadening monitor sounds by the use of earphones.

A fourth small room was equipped with a video tape player and monitor for playback purposes. Trainees were free to utilize this machine to view immediately their task performances. This room also served as a conference location and as a storage room for lock-up of all project equipment.

When elementary pupils were at the training center, they divided their time between acting as subjects for task performance, and a special project conducted in another part of the building. This special project was conducted in a large room which was labeled a holding center. Equipped with a movie screen, a record player, and 8 mm. cartridge projector, metal folding chairs, and an abundant supply of crayons, pencils and paper, this holding center was staffed by an experienced elementary school teacher who used a multi-media based social studies program adapted from "Man: A Course of Study" curricula.[3] The success of this holding station was very important to the total training center operation. The space used for this purpose was very adequate, the teacher hired to conduct instruction in the center was an exceptionally capable classroom teacher, and the type of instructional program conducted was amenable to a primary training center requirement, i.e., capable of continued operation in the face of repeated interruptions to draw off small groups of pupils for use as training subjects. Certain difficulties were encountered, however, and centered around the appropriateness of the curriculum chosen to the wide range of pupils moving through the center. Further operations of this type of training enterprise would require multiple curriculum differentiated more appropriately for each level of children.

The training center was staffed by persons playing various types of roles: center operators, holding center teacher, and task evaluators. There were two persons staffing the center at all times who could be considered operational personnel. One was a manager who had primary responsibility for coordination and movement of children and participants. The manager coordinated the daily training schedule as sent from the resource center scheduler, greeted pupils upon their arrival at the center and conducted them to the holding station, and generally facilitated trainee task performance and the work of task evaluators. This manager's role was extremely important with particular respect to his influence on the overall operation of the center, and on the cooperative acceptance of pupils of the role they were to play in the activities of the center. The technician had a primary responsibility for operating and maintaining all video and audio tape equipment at the training center. To some extent, the manager and the technician interchanged responsibilities when necessary for one to be away from the premises or when demand was exceptionally heavy.

As previously mentioned, an experienced classroom teacher filled the role of a holding station teacher. This teacher had the responsibility for conducting an instructional program for the children while they were at the center. Task evaluators, whose role is more carefully described in later sections on evaluation, manned each of three teaching stations. For the prototype operation, these evaluators were faculty members, senior graduate students and para-professionals chosen because of extensive classroom teaching experience. Three training stations were staffed at all times; however, as the number of evaluators was quite large, each one served for brief times only as it suited their normal schedule of work activities.

Trainees' Use of Center. The sequence of events which typically transpired as a trainee utilized the training center for task performance is descriptive of the total utilization made of the prototype training center. After being checked into the center by the center manager, a trainee was assigned to a teaching station and informed of the identity of the evaluator who would assess his task performance. Information was also conveyed to the evaluator identifying the trainee, the task he was to perform, and the number of pupils with whom he would be working. The trainee completed all identifying information on task evaluation forms (one copy for the center and one copy for his own records), and presented it to the evaluator for use during the session. Unless requested by the trainee, he was typically not assigned to the same evaluator two times in a row.

The trainee picked up his personal video tape which was re-used from task to task and either threaded it onto the video recorder or gave it to the evaluator who did so for him. The trainee was then ready to set up the teaching station in an appropriate manner to conduct the teaching task which he had been assigned. When the trainee was ready to begin his lesson, he so indicated and the appropriate number of pupils were brought from the holding center to his teaching station. Since all recording was done from outside the teaching station, it was possible to record the entire teaching episode beginning with pupils entering the station and ending as pupils left.

After the performance was complete, the trainee was free to gather whatever special materials he brought with him, and to proceed to have at least a brief discussion about his performance with the evaluator. These conferences were of two types. In the simplest of conferences, the trainee and evaluator discussed only briefly the performance, reached mutual consensus on adequacy of the performance in terms of the evaluation form, and terminated the conference. At other times, not only did the trainee and evaluator discuss the performance and evaluation instrument, but the evaluator, upon trainee request, would make himself available to view the video tape of the performance and serve as a reactor for the trainee. In those few instances where the trainee and the evaluator disagreed on the assessment of the task, the trainee's counselor was called to view the tape and help make a final decision as to completion. In most instances, however, trainees evaluated their own performance consistently with the evaluator.

Almost all trainees had the opportunity to view their tapes with the evaluator after the session if they so desired. Occasionally, scheduling of these sessions was very tight and insufficient time was available to the evaluator. In such instances, the trainee had the option of playing the tape alone in the playback room or seeking another staff member to view it with him. This proved to be a successful procedure. It was even possible for trainees to take their tapes from the training center and view it on the playback machine at the resource center later in the day. According to the resource center personnel, many trainees viewed tapes in this way, some several times by themselves. Additionally, many trainees had their counselors look at their tapes as an added learning experience.

After an evaluation session, the trainee had several options open to him. If the task had not been completed, he could either go back and use enabler materials to help correct what he perceived to be his deficiencies, or he could request the privilege of trying the task again immediately. He was encouraged to use his faculty counselor in this instance, and typically did. These counselors were valuable in guiding trainees in procedures to follow in preparing to reteach a task. If the trainee had completed a task successfully, he then went back to the resource center and began work toward the next task.

Procedures for Evaluation & Counseling

Evaluation and guidance of trainees occurred frequently during the prototype. If related back to the theoretical instructional model (see Figure 2) on the basis of which the prototype was built, trainees were evaluated on their performance at task level (I) and evaluated their own proficiency at the enabler level (II). The instructional model further provides for ready availability of faculty counseling to assist trainees in decision making as well as for reflective consideration of progress through the program and its meaning.

Enabler Self Assessment

Self assessment of enabler proficiency took place at the resource center. Although several enabler tasks called for essay responses or completion of checklists, by far the largest majority was short, recall or association type instruments formatted either for paper-and-pencil response or for completion at the computer terminal. All results of self-assessment, as well as a listing of the instructional options used, were entered by the trainee directly into performance data files at the computer terminal. (Enabler proficiency data is described to some detail in Chapter IV)

Task Evaluation

Task evaluation took place at the training center. A specially trained evaluator observed each trainee performance via a TV monitor. An evaluation form designed by the project staff was used by the evaluator to both note the occurrence of relevant behaviors and to provide a reference point from which to begin discussion with the trainee of events of the task performance session.

The evaluation forms used to evaluate trainee task performance can best be described as a sign system, requiring evaluators to check off specific acts or incidents of behavior which may or may not occur during the training session. Appendix B contains an example of an evaluation guide that was designed to evaluate Task 006. It is representative of the instruments used for the ten teaching tasks of the prototype. The first page of the instrument contains task specific items. The second page contains twenty-four items that are generally common to all teaching tasks. Although a frequency count of occurrences of desired behaviors can be derived from the instrument, the only official score actually recorded during the prototype was task complete or incomplete.

Six different evaluation forms were used. The first was constructed to assess Tasks 1 through 5. These evaluation guides were designed by project personnel after examining the task analysis and the behavioral objectives. It should be remembered that the task performance was designed to require performance competency of specific kinds (enabling objectives). Therefore, task evalution must furnish evidence of instances of a particular group of enabling behaviors. The evaluation procedures worked well enough; i.e., it was possible to monitor traine progress using such techniques. However, no validity or reliability checks were made on specific instruments used, and consequently, no attempt is made here to base conclusions on specific data or statistical results.

For descriptive purposes, however, samples of data collected can be seen in Chapter IV and in Figure 5. The information reported in Figure 5 is useful in conceptualizing the record keeping on task performance, and the frequency of performance on the part of the nineteen trainees in the prototype. This summary information presented in Figure 5 is based on printout 6 found in Appendix C.

Counseling Procedures

Primary faculty interaction with trainees in the prototype implementation of the instructional model was very different from the typical lecture/class model frequently found in teacher education programs. As far as instruction itself is concerned, trainees were involved primarily in independent study activities utilizing enabler specific resource materials. However, the major interactive role played by faculty members was that of faculty counselor. Two Department of Elementary Education faculty members from whose block classes the trainees were drawn assumed complete responsibility for counseling and advisement of trainees throughout the prototype. Each counselor was assigned half the trainees and met regularly with them both in small group reflective seminar sessions, and individually in one-to-one counseling sessions at the request of trainees.

As trainees worked their way through instructional options and taught their tasks, these two counselors found themselves in heavy demand as resource persons who would listen to trainees describe their problems in study and planning for task performance, and who would offer evaluative guidance to help trainees make wise decisions about specific activities throughout the prototype. These counselors kept close track of the progress of each trainee and made every effort to help trainees be as thoroughly prepared as possible for each task.

RESULTS ON TASK PERFORMANCE BASED ON ELEMENTARY MODEL EVALUATION GUIDE

1	N	Average Percentage	S.D.	Range
Task Number				
003	12	88	11	61-100
004	11	91	11	71-100
005	17	95	8	75-100
006*				
Part I	18	86	14	50-100
Part II	18	94	8	73-100
007				
Part I	17	90	13	50-100
Part II	17	93	9	73-100
008				
Part I	17	94	9	65-100
Part II	17	96	6	79-100
009				
Part I	13	94	8	75-100
Part II	13	97	4	90-100
010				
Part I	2	94	8	88-100
Part II	2	98	3	96-100

*After Task 5 a revised evaluation guide was implemented and produced two scores.

FIGURE 5

The demand on counselors by trainees throughout the period of the prototype was relatively high. When overall expectancies of senior faculty members are taken into consideration, it would appear from the prototype experience that when functioning as trainee counselors with no assistance from other personnel, that a one-to-ten or one-to-twelve ratio of counselor to trainees is probably a maximum load which can be efficiently accommodated. This feature of the prototype operation was highly popular with trainees and ways of providing comparable guidance when large numbers of trainees are involved in an operational program are discussed in later chapters.

The reflective seminar mentioned in the paragraphs above was a regularly scheduled meeting of a group of counselees with their counselor for the purpose of discussing as a group their perceptions of what was happening to them in the prototype experience. Such sessions have the potential of providing for program feedback, for emotional and intellectual reflection on both problems and progress within the program, and as a session where individual trainees can in a non-threatening situation take stock of the activities they are pursuing so often independent of other trainees.

Reactions to Prototype Operation

The project staff carefully solicited both substantive and attitudinal reactions to the prototype implementation from both trainees and faculty members. Some of these reactions are reported in the following paragraphs.

Trainee Reactions

After completion of the prototype, trainees were given an attitudinal questionnaire assessing their reactions to the prototype. Appendix D contains a copy of the questionnaire used. The intent of the questionnaire was to assess the attitudinal reactions of trainees regarding the elementary model prototype. Figures 6 and 7 report the trainees' responses to the questionnaire. The trainees circled one of five responses for each question ranging from strongly agree to strongly disagree. Figure 6 contains the positive questions used. On positive questions, if a trainee

STUDENT ATTITUDE TOWARD ELEMENTARY MODEL PROTOTYPE

POSITIVE QUESTIONS

Questions	Mean*	Range
1. As a change of pace from usual classroom learning the prototype simulation was welcome.	1.4	1-2
2. All of the students enjoyed the prototype.	2.8	2-5
4. I would choose to participate in the prototype rather than participate in a group discussion on the topic.	1.5	1-3
6. There is definite need for instructional simulation.	1.8	1-4
8. In preference to lectures on the same subject, I would like to try more instructional simulation.	1.9	1-3
9. The prototype was stimulating.	1.4	1-2
11. Universities should use class time for instructional simulation.	1.9	1-4
12. The prototype I participated in was interesting.	1.2	1-2
13. Instructional simulation should be considered a valuable part of teacher education.	1.3	1-2
14. I was inspired by this prototype to make full use of my capabilities.	1.7	1-3
17. This simulation increased my knowledge in this subject area.	1.5	1-3
20. I learn more from the prototype than from group discussion.	2.0	1-4
21. I learn more from the prototype than from individual study.	2.0	1-4
23. Participating in a prototype such as this one is the most effective way to learn about teaching.	2.0	1-3
26. The prototype was fun to me.	1.8	1-4
28. My liking for the prototype outweighs my dislike.	1.3	1-2
31. The feeling I have toward simulation is good.	1.7	1-3
32. I feel a positive reaction toward the prototype.	1.7	1-4

FIGURE 6

STUDENT ATTITUDE TOWARD ELEMENTARY MODEL PROTOTYPE

POSITIVE QUESTIONS CONTINUED

Questions	Mean*	Range
34. I'll remember what I learned in the prototype	1.5	1-2
35. During internship, the information obtained from this prototype will be valuable.	1.4	1-3
37. I learned while participating in the prototype, but it was hard work.	1.9	1-4
40. I felt like getting involved in the prototype.	1.7	1-4
42. I felt like learning the material to improve my performance.	2.1	1-5
43. I worked hard participating in the prototype.	1.7	1-4
49. I felt at ease participating in the prototype.	2.6	1-5

*Based on Likert scale of 1-5, 1 corresponds to strongly agree, 5 to strongly disagree. N=19.

STUDENT ATTITUDE TOWARD ELEMENTARY MODEL PROTOTYPE

NEGATIVE QUESTIONS

Questions	Mean*	Range
3. I would rather learn the tasks some other way than the prototype.	4.3	3-5
5. The time spent on the prototype was completely wasted.	4.9	4-5
7. The value of simulation is overestimated by people.	3.6	2-5
10. Only a few of the students enjoyed the simulation prototype.	4.1	3-5
15. The experience was not particularly beneficial.	4.6	2-5
16. In view of the amount of time involved, I feel too little was accomplished.	4.0	4-5
18. I found it difficult to concentrate on learning anything.	4.2	3-5
19. I would have learned more from a lecture.	4.5	3-5
22. The students don't remember anything they learned in the prototype.	4.3	3-5
24. Simulation does not provide the necessary motivation to learn the project.	4.2	2-5
25. This prototype is not worth the time and effort.	4.7	4-5
27. The prototype made me feel uncomfortable and irritable.	4.1	2-5
29. When I hear the word simulation or prototype I have a feeling of dislike.	4.4	2.5
30. I approach simulation with a feeling of hesitation, resulting from fear of doing poorly.	3.6	1-5
33. The material covered by this prototype was uninteresting.	4.0	1-5
36. I don't know any more about teaching than when I started.	5.0	4-5
38. This prototype has no influence upon the trainees.	4.7	4-5
39. I participated because I had to.	4.3	3-5
41. I didn't apply myself.	4.3	2-5
44. This prototype is not appropriate for teacher training.	4.7	3-5
45. When the tasks became difficult, I gave up.	4.4	2-5

FIGURE 7

STUDENT ATTITUDE TOWARD ELEMENTARY MODEL PROTOTYPE

NEGATIVE QUESTIONS CONTINUED

Questions	Mean*	Range
46. I found myself just trying to get through the tasks rather than trying to learn.	3.8	2.5
47. It was difficult to become motivated within the prototype context.	3.8	2-5
48. I felt insecure participating in the prototype.	4.1	1-5
50. I was under a strain while participating in the prototype	2.8	1-5
51. This was a confusing prototype.	3.7	2-5
52. I wasn't satisfied with how I performed in the prototype.	3.6	1-5
53. I didn't know what I was doing during the prototype.	4.2	2-5

*Based on Likert scale of 1-5. N=19.

circled a 1, then it could be interpreted as indicating a positive or favorable attitude toward the training program. From the data it can be concluded that the prototype was successful in the subjective opinion of the trainees.

The trainees' responses to the negative questions as shown in Figure 7 supports the prototype in a manner similar to responses to the positive questions. On negative questions, if a trainee circled a 5, then it could be interpreted as support or favorable opinion for the training program. (Other student reactions to aspects of the program are included as data reported in Chapter IV).

Faculty and Staff Reaction

Faculty reactions to participation in various phases of prototype development or implementation were, as would be expected, somewhat varied. It would appear reasonable to conclude that they were generally favorable.

Certain staff reactions might be characterized under the heading of subjective needs of the staff. Earlier sections of this chapter described a period of time early in the development of the prototype when progress toward the goal of building an implementable prototype curriculum was painfully slow. Reaction from those faculty members most centrally involved during that period of time might be useful guidance for future development activities leading toward an operational program. The frustration of struggling with a completely new set of theoretical ideas, while working with a diverse group which included not only faculty members but graduate students, undergraduate students and public school persons, led the faculty members involved to see the need for regular and strong leadership in order for activities to be maximally productive. Without adequate guidance and decision-making on the part of a specified development group leader, the many unforseen complications which arise during such a period of time often serve more to retard progress than to enhance it.

It was also evident to staff involved in development and implementation phases of the prototype that because of the systems nature of the program under development, the role of a program manager becomes crucial. To develop an instructional program to a specific model of instruction and to specific sets of outcome specifications, demands that the development team forfeit at least to a certain extent the autonomy of operation to which they are accustomed. The faculty and staff who will be involved in the development and implementation of such curricula must learn to work together in ways to which they are not accustomed. Indeed, there could well be a need for a series of workshops in which faculty and staff consider carefully the responsibilities of group membership.

One very positive reaction of the faculty and staff involved in the development effort was to the opportunity to create new patterns of instruction and to gather or create new instructional materials. The experiences gained in designing and producing instructional resources "in-house" proved to be extremely useful, particularly the development of instructional video tapes.

The tapes made by the development group, however, came in for a share of their criticism. For example, observation of their use during the prototype implementation led to a finding that trainees tended to copy the behavior demonstrated rather than to use it as a stimulus for creative activity of their own. To illustrate, the open-close strategy tapes were made with the instructor sitting at a desk. Trainees who watched this tape then thought that they, too, should sit while teaching. In some cases the tapes should have contained segments where the instructor used a range of audio-visual equipment rather than just his verbal interaction skills. After trainees had viewed the tapes, they often had to be encouraged and reminded not to do it just as did the instructors on the tape.

These instructional material weaknesses are easily corrected, but are representative of the type of learning which accrues to faculty and staff who engage in such a development enterprise. It is this type of faculty development and faculty self-study which is referred to later in the chapter on faculty development.

One significant problem with the implementation of the theoretical instructional model might be referred to here, although evidence is not adequate at this point to reach a conclusion. It appeared that trainees were highly performance oriented and much more eager to pursue instructional options like the demonstration video tapes which were focused on the "how" aspects of task accomplishment. They seemed less interested in the whys and whats of task accomplishment. This points up the need for much research on the nature of tasks as conceptualized in this model. Although some of the tasks assigned trainees in the prototype experience were quite demanding in the terms of performance, the concern expressed here would suggest that they must yet be redesigned to demand adequate depth and background in order to perform them successfully. It is also possible that the criteria for conceptual performance needed to be reassessed since a criterion level set too low may not provide a maximum requirement for study prior to performance.

A further example of the needed work on development within the instructional model is the example of those instructional options intended to assist the trainee in developing questioning techniques. To adequately develop a variety of questioning techniques requires both a great deal more analysis and practice than the few options allocated during the prototype to this enabler. The extent to which developers are able to provide for the depth of analysis and practice over a progression of teaching tasks will determine the ultimate success of this particular instructional model. It will probably be most successful to spread out learnings in any enabler area to assure systematic repetition of teaching skills, professional content, and attitude development.

Probably of concern mostly to experienced university faculty members is the adoption of a philosophy of individualized, self-paced experiences for the learner which to some faculty members implies also the adoption of a philosophy of non-interactive and even non-instructional teaching-learning. There are many faculty members, particularly those who were primary observers of the prototype implementation, who raise major questions relative to the particular function of the professor if he does not carry on traditional classroom instruction.

Like most innovations, this one apparently takes some getting used to, and, when understood, it becomes readily apparent that it does not cut down in any way upon the amount of time an individual faculty member spends with students. In fact, it increases the one-to-one and one-to-small-group interactive relationships well beyond anything ever possible in lecture instruction. Rather than spending extensive time in class on "beginning" type content, faculty members find themselves much more free to create and participate in open professional type seminars which concentrate upon the uses of or implications of option type materials. This change in roles is further discussed in Chapter VI.

CHAPTER IV

COMPUTERIZED MANAGEMENT CONTROL SYSTEM

Introduction

The Phase I report on the F.S.U. Model Elementary Teacher Training Program included a description of an idealized management control system. It was anticipated in that report that the management system would be used by students, administrators, and researchers, and, in fact, that the total system would involve the use of two computers. The first computer would be a medium-sized stand-alone system to be used directly in the implementation of the model and would serve as a data acquisition and instructional device. The second computer would serve as a master record-keeper and report generator for the researcher. The second computer would be used only on a very limited basis by the Elementary Model personnel. The initial report also discussed such issues as real-time versus off-line uses of the stand-alone system, personnel requirements and reporting procedures.

Within a framework of investigating the fiscal, human, and technological feasibility of Phase I specifications for a computerized management control system, the Phase II project further explicates the functions designated for the total system and investigates procedures which provide parametric data for projecting specifications for the operational management system. These activities were focused on three primary areas of significance for the total project.

The first set of activities tested the feasibility of the day-in-day-out utilization of the computer for data acquisition for the management of the Elementary Model program, as well as for instructional purposes. The second area dealt with the feasibility of developing master computer programs which would: (1) accept formatted data from the data acquisition computer system, (2) create a permanent data file, and (3) sort this data in order to provide meaningful reports for curriculum development and research purposes. These functions are associated with the long-term analysis of student performance and the effectiveness of the instructional materials. The third area dealt with the utilization of this same data in order to provide cost/benefit analysis and fiscal management procedures.

The overriding consideration in all of these activities was to generate data and feedback from students which would permit maximally valid projections for a computer system which would be capable of serving the needs of approximately 1,000 students. Although total program projections are based on 1600 trainees to be enrolled at full operation, the figure 1000 is considered to be a realistic estimate of the number of that total interacting with the computer at a given time. The primary concern was to combine the information from the 19 students in the prototype study with the extensive experience of the project personnel in the area of CAI in order to derive the optimal functions of a management-instructional system which would also provide for direct student-computer interaction.

Certain computer functions were developed and field tested in the prototype study. Other functions projected as needed for full operation have been investigated at F.S.U. and elsewhere. However, it must be recognized that to date, there exists no complete operating system which has the total capabilities for executing all these integrated functions. This feasibility study provides further insights into the fiscal, technological and human problems and potentialities of such a system. Only through the continued investigation of the functions, both in isolation and as an integrated system, will the total potentialities and benefits be identified and developed; only in a total operational setting will the complexities of the interactions of all these functions be detected and successfully managed.

Overview of Feasibility Study Activities

In the sections which follow, a detailed discussion is presented in terms of the activities pursued in each of the three areas described above, namely, day-to-day operations, curriculum and student evaluation, and cost benefit analysis. These activities were carried out by project personnel who interacted directly with the curriculum and instruction group who designed the three-week prototype study and with the project management personnel. The primary consideration of the computer system group was to institute activities which would provide information on the feasibility of various systems components, and at the same time provide minimal interference with the ongoing field study. In order to achieve the objectives of the prototype study, the equipment and capabilities of two additional organizations were brought to bear on the problems. A KSR-35 teletype terminal was rented from the Southern Bell Telephone and Telegraph Company and installed in the resource room in order that computer-student interaction could be investigated as an integral part of the three-week field study. Certain computer programming work was subcontracted to the INTERTECH Research Corporation. This subcontract resulted in the production of programs (for the Control Data Corporation 6400 computer) which would provide information for the long range planning and cost benefit analysis procedures. The integration of these activities into the total feasibility study are described in detail in the sections which follow.

Feasibility of The Stand-Alone System

Purposes of the Study

The first phase of the management system feasibility study dealt with a series of activities which were designed to provide parametric information in order to derive specifications for the operational computer system. The four primary objectives for the investigations in this area, and the types of information which were obtained, are listed below:

1. To determine the feasibility of implementing an on-line CAI based data acquisition system in the three-week field study. It was deemed mandatory that the existing equipment in the F.S.U. CAI Center be utilized in order to gain insight into the problems associated with instituting a computer terminal for data acquisition purposes within a program for individualized

instruction. Information secured here was primarily in terms of training the students to use the equipment, developing programs for data acquisition and testing, and determining the effectiveness of the student-terminal interface.

2. To obtain empirical data on the ability of the trainee to enter via terminal, information on his own learning progress into the computer system. The data here included information on percent participation by trainees, numbers of errors made, and general attitudes toward the use of the terminal
3. To obtain time estimates of trainee usage of the terminals. These time estimates were based upon two types of trainee activities; namely, recording of their progress in the training program, and taking enabler tests which were provided by the computer system.
4. To acquire data from the trainees which could be utilized in the second and third components of the study; namely, the programs associated with long range planning and analysis and the cost benefit analysis.

Equipment

The computer system utilized in this part of the study was the IBM 1500 CAI system. It is located in the CAI Center at F.S.U. This system had been previously modified by the addition of a PDP/8 computer to accommodate remote terminals, i.e., terminals located beyond the confines of the CAI Center. For this particular study, the terminal (a KSR-35 teletype terminal) was located in the Education Building, a distance of approximately one quarter of a mile from the CAI Center. The terminal was connected to the PDP/8 computer by a conventional telephone line. Since the terminal ultimately tapped into the IBM 1500 CAI system, it was thus possible to design a dialogue between the student and the computer which was written in Coursewriter II. (Coursewriter II is the tutorially oriented instructional language which is utilized on the 1500 system.)

Materials and Procedures

The primary source of data for this study was information written by trainees on task data sheets which were described in Chapter III (See Figure 8). Each data sheet provided for a complete record of the trainee's performance on a single task from the prototype curriculum (See Appendix A). The data sheet for a particular task was initiated in a conference between the trainee and his counselor. All information on enabler and option selection and performance, as well as final task evaluation information, was entered on this sheet. (Note here that options were coded according to media utilized--see Appendix A).

The means and methods for collecting these data were developed after the rationale for tasks, enablers and options had been decided, and the instructional materials were in the preparation/development process.

After a trainee completed the criterion test for a task, and had been informed of the results, he presented his task data sheet to the evaluator for entry of this data. By such a procedure, the trainee was assured that his enabler performance scores would not, in and of themselves, influence the evaluator's scoring of the criterion test on the task. It was explained to the trainees that the purpose of enabler tests was to provide them with feedback concerning the degree to which they were prepared for a given part of the total task.

A program called DATA was written specifically to ask the trainee about the information which he had written on his task data sheet. This procedure is in contrast to the typical CAI program which often provides information to the student and then tests him on his understanding of that information. This program was primarily a dialogue which asked the trainees to respond to a variety of questions by typing in information which had been written on their task data sheets.

DATA was designed to assist in (1) examining how students react to entering their own data, (2) determining if non-computer oriented trainees could enter such information with an acceptably low error rate, and (3) determining the time required to complete

TASK DATA SHEET

COUNSELOR ______________________________

SOCIAL SECURITY NO. ____________________ ********* **STUDENT NAME** ____________________

TASK NUMBER __________ *** **DATE TASK ASSIGNED (modayr)** ____________________ ******

DATE - EXPECTED COMPLETION (modayr) ______________ ******

ENABLER	**RES.OPT. & MEDIA CODE**	**STUDY TIME**	**SCORE (00-99)**	**DATE ENTERED COMPUTER**
***	***	**.*	**	******
		.		
		.		
		.		
		.		
		.		
		.		
		.		
		.		
		.		
		.		
		.		
		.		
		.		
		.		

TASK CRITERION ______________ ****** **GIVEN BY** ______________ **SCORE** ______ **

TASK CRITERION ______________ ****** **GIVEN BY** ______________ **SCORE** ______ **

TASK CRITERION ______________ ****** **GIVEN BY** ______________ **SCORE** ______ **

COMMENTS ____

____

For additional comments check this box ☐ and write on reverse side.

FIGURE 8

these activities. In order to discriminate among the responses of various trainees on various tasks, the trainee was required by the DATA program to enter his social security number and the number of the task for which he wished to enter data. Upon analysis of this task number (by the DATA program), the trainee was transferred to the corresponding segment of the total program which would, in turn, code each of the trainee's responses to questions with appropriate identifier labels. These identifier labels then made it possible to systematically analyze the data.

A trainee could enter as much data as he desired during any session at the terminal. Questions were asked at appropriate points to allow the trainee to continue entering data on the same task or to enter data on another task. When the trainee was ready to terminate this entry of data items, he was then administered a series of ten questions. The first five items were from the Spielberger Trait-State Anxiety Scale (1969)[4]. The state anxiety items which were chosen were designed to measure the anxiety of a person which is attributable to a particular situation in which he finds himself. The exact nature of this 5-item scale is indicated in the results section, as well as the trainees' responses to the questions. The second set of items related to the trainees' attitudes toward learning and their satisfaction in interacting with technological devices. There were, in fact, ten of these latter items, but only five of them were administered with the odd numbered tasks, the other five being administered with the even numbered tasks. These items were selected from the Davis, et al Attitude Toward Learning Inventory (1967)[5]. Both scales were chosen because of their relevance to the problem which was being assessed and because of their previous utilization and validation in other experimental studies.

A second CAI program, called QUIZ, provided an additional type of information to the project. The QUIZ program consisted of a series of objective tests which accompanied a similar number of enablers in the prototype study curriculum materials. From that group of tests designed by the curriculum group for the various task enablers, those tests which were most amendable to computer implementation were coded into the 1500 CAI system.

The trainee (at the terminal) signed on to the program QUIZ and was asked to identify the task and option which he had just completed. The program would then branch to the appropriate quiz and present it to him one item at a time with corrective feedback. At the conclusion of the test, the trainee was given his total score for the test. He was also given an indication that he should either proceed because he had performed satisfactorily, or that he should consider reviewing the option or utilizing another option in order to enhance his skills in this particular area.

In addition to the installation of the terminal device and the design of the data acquisition forms, the staff personnel also participated in the orientation of the trainees to the terminal system. During the week prior to the initiation of the prototype study, staff members met with trainees in groups of ten and explained the total rationale for the system and how it would operate. Each trainee was given time to sit individually at the terminal and become familiar with its operation. It also became necessary, during the first few days of the actual field trial, for the resource room coordinator to spend time with a certain number of the trainees in their initial attempt to enter data into the computer system, and to provide additional instruction and review for the trainees in terms of the operation of the teletype terminal.

Results

The results of the field study implementation will be summarized under the four categories which relate to the original objectives of the activity, namely, (1) feasibility of the implementation, (2) human factors problems, (3) time parameters, and (4) data formatting for research and costing programs.

Feasibility of Implementation. It was found that in terms of actually presenting questions to trainees and deriving information from them, the CAI Coursewriter II language was ideally suited for this application. There were no problems whatsoever in designing the programs for this purpose. Some difficulty was experienced in terms of obtaining the teletype terminal and having it installed. However, this is to be expected with this type of equipment because of the high demand for its use. It operated satisfactorily throughout the duration of the prototype study.

The DATA and QUIZ programs were scheduled to be up every day from 8:30 until 2:00 and the terminal was made available to trainees on a first come first serve basis. Communication was easily maintained between the Resource Center and the CAI Center via telephone when minor difficulties arose. The terminal was also activated certain evenings during the prototype study. Occasionally, actual programs needed were not available. However, in each case the situation was remedied and trainees were able to use the terminal.

Human Factors Problems. The trainees' responses to the request that they enter their enabler data via the teletype terminal was satisfactory with one exception. Approximately 90 percent of the trainees entered their data on the first six of the tasks. However, the participation lessened on latter tasks during the third and final week of the prototype study. It should be pointed out, however, that trainees were asked to enter the data, but no pressure was brought to bear if they did not. They were aware that neither their grade nor their progress through the tasks depended upon entry of data at the terminal.

The analysis of individual responses (actual data entered by trainees) indicated the accuracy of these data as 98.0 percent correct (there were 14 errors on 1,320 data items entered). The DATA program was specially designed to detect obvious errors in data submitted by the trainees. For example, a date which was indicated as the 39th of the month was checked and rejected as incorrect. The trainee was so informed immediately and asked to reenter the data. However, no check could be made on an error such as entering 19 for 29. As the data indicated, there were only 14 such inaccuracies in all data items which were entered, excluding detectable obvious errors. This accuracy percentage is based upon a comparison of the actual computer records which were generated with the task data sheets (see Figure 8) which were written out by the trainees.

Trainee responses to the anxiety and the attitude toward learning items are summarized in Figure 9. The means and dispersions on these items seem to indicate

ITEM	RESPONSES				MEAN
	1. Not at all	2. Somewhat	3. Moderately So	4. Very Much So	
1. I am tense	36	26	10	3	1.73
2. I feel at ease	6	23	16	30	2.93
3. I am relaxed	11	17	16	31	2.89
4. I am jittery	47	23	5	0	1.44
5. I feel calm	8	15	21	31	3.00

Trainee Responses To State Anxiety Scale Items

Figure 9

that the trainees were not anxious in terms of their interaction with the computer. It is also interesting to note (See Figure 10) that, as a group, they indicated that (1) they would probably recommend this type of experience to their friends, (2) they preferred to plan their own study schedule rather than have someone else plan it for them, (3) they tended to be undecided about enjoying working with mechanical gadgets, (4) they did not feel the teacher was responsible for seeing that they learned the subject matter, and (5) they tended to enjoy working things out for themselves rather than being told. One item upon which they were most clearly divided and uncertain was the question dealing with whether the ideal learning situation involves one student and one teacher. Responses ranged from most probably to most probably not.

It should be noted that certain trainees entered more data at the terminal than other trainees, and therefore, they were asked these questions more often than were other students. However, the fact that there were few extreme reactions to the questions would seem to indicate that trainees did not find interaction with the terminal nor the entry of data a threatening or unpleasant experience.

It is also perhaps worth noting some of the predominant, informal comments made by trainees about the utilization of the terminal. It was explained that this was purely an aspect of the research activity and that in the operational setting such questions would not be asked, or certainly not with the frequency with which they were presented in the prototype.

The other area of concern of a small number of trainees was the lack of true dialogue between the trainee and the computer. These trainees had experienced CAI situations in which the computer played a much more human-like role. In the DATA and QUIZ programs there was a very straight-forward questioning procedure with very little "humanization" of the dialogue process. The trainees felt that their participation, particularly in the testing, could be greatly enhanced through a more dialogue-like interrogation of their understanding of their enabler performance. They disliked simply using the terminal as a device for printing out a test, recording their responses, and

TRAINEE RESPONSES TO COMFORT ITEMS

ITEM	Very probable	Probable	Undecided	Probably not	Most probably not	MEAN
1. Would recommend this type of learning experience to my friends.	33	6	4	1	0	1.39
2. I prefer to plan my own study schedule rather than have someone else lay it all out for me.	27	13	3	1	0	1.50
3. I enjoy working with mechanical gadgets of all kinds.	13	7	10	12	2	2.61
4. It is a teacher's responsibility to see to it that I learn the subject matter of a course.	0	5	1	16	22	4.25
5. I like to figure out how to do a thing by myself rather than be told.	5	27	6	5	1	3.32
6. I learn best by working closely and directly with the teacher.	5	12	4	5	4	2.70
7. Whenever I have to operate a machine, I become nervous.	0	4	1	12	13	4.13
8. I prefer to study a particular course at a regularly scheduled time rather than vary the time to fit my needs and inclinations.	1	2	1	13	13	4.17
9. When I am learning a new subject, I like to skip around and let my interest lead the way rather than proceed through it on a step by step basis.	2	9	2	10	7	3.37
10. The ideal learning situation involves one student and one teacher.	5	4	9	5	7	3.17

FIGURE 10

providing feedback. This may be an important psychological consideration in terms of future developments.

Time Parameters. An analysis of the records from the DATA program provided the information "on student terminal time" shown in Figure 11.

TERMINAL TIME PER STUDENT PER ENABLER

Student Number	Average Time (Minutes) Required "On Terminal" To Enter Data For Each Enabler
T001	2.6
T002	2.5
T003	.9
T004	1.6
T005	2.1
T006	2.0*
T007	1.4*
T008	1.3*
T009	1.7*
T010	1.5
T011	2.1*
T012	1.9*
T013	1.8
T014	1.4
T015	1.5
T016	1.8
T017	1.8
T018	2.5
T019	1.7

*These six trainees entered 55 percent of all the data elements entered into the system.

Figure 11

An average of 1.7 minutes/enabler of "on terminal" time is required if we assume that the six trainees who entered over one-half of the data are representative. However, this "on terminal" average is increased to 1.8 minutes/enabler if the data of all nineteen trainees are used. Therefore, for simplicity, certain projections will be based upon 1.75 minutes/enabler of "on terminal" time.

The data in Figure 11 were obtained from a detailed listing of the trainees' responses to the DATA program. In the program itself, a clock was set to determine the time spent by the trainee from the initiation of the questioning by an enabler, until he had completed the information for that enabler. If he entered information on a number of enablers at the same sitting, separate clock readings were obtained for each enabler.

An additional type of time parameter is obtained through the terminal record which is provided in a master file for each student who utilizes the 1500 CAI system. This record is the primary source by which the computer determines where the student should reenter a learning program if he has signed off. A portion of this record also contains the student's total clock time, i.e., total cumulated time between every sign-on and sign-off, that a student has spent on a program. These times, for both the QUIZ and DATA programs, are listed in Figure 12 along with the means for the group. It is interesting to note that on the average, trainees spent approximately an hour in total elapsed time in each of these two activities. However, there is a great deal of variability among trainees as indicated by the range of times.

These time-on-terminal data may be utilized to make projections about the number of terminals which would be required for the on-line entry of learning performance by students. Analysis of the task data sheets from the prototype indicates that the trainees attempted 2.87 enablers per task and that they completed 2.22 tasks per week; therefore they used an average of 6.4 enablers per week or 19.2 enablers for the prototype. If this total number of enablers, 19.2 is divided into the total time spent at the terminal, 63.68 minutes (according to the terminal records) it required approximately 3.3 minutes per enabler to enter the information into the system. This is in contrast to the 1.75 minutes per enabler as derived by the very precise programming methods described above.

Discrepancy in these two methods may be attributed to the fact that the total time on system included the sign-on time, time to enter social security number and

STUDENT CLOCK TIME (IN MINUTES) FOR DATA AND QUIZ PROGRAMS

STUDENT NUMBER	QUIZ TIMES	DATA ENTRY TIME	TOTAL TIME
T001	87	76	163
T002	31	36	67
T003	66	94	160
T004	no computer tests	31	31
T005	30	49	79
T006	36	74	110
T007	125	70	195
T008	61	62	123
T009	41	55	96
T010	7	36	43
T011	143	125	268
T012	129	78	207
T013	no computer tests	24	24
T014	10	65	75
T015	41	203	244
T016	7	16	23
T017	56	23	79
T018	133	43	176
T019	135	50	185
	1138	1210	2348
19=	59.86	63.68	123.54

FIGURE 12

task identification, as well as the responses to the quiz and learning attitude items. For projection purposes, an average of the two estimates, 2.52 will be utilized to estimate the amount of time per enabler which would be spent at the terminal for data acquisition purposes.

Using these parameters it may be shown that the average trainee will require 16.128 minutes per week in order to enter the required data. For 1,000 students there would be a requirement for 16,128 minutes of terminal time per week. If a terminal were available 9 hours a day, 5 days a week, there would be 2,700 minutes of terminal time available per week. Dividing this figure into the total number of minutes required results in an estimate of almost 6.0 terminals which would be required for this function. However, it must be assumed that due to down time and incomplete usage of the terminals, there would be an approximate 75 percent utilization rate. Therefore, there would be a need for 8 terminals to service 1,000 students for data entry purposes alone.

Almost identical estimates would be derived for the number of terminals required in order to provide students with time to take quizzes at the terminal. The average time required per trainee in the prototype for taking quizzes was 59.86 minutes. This is a difference of only 3-1/2 minutes in the average time required to enter data. Therefore, approximately 16 terminals would be required for both data acquisition and quiz type usage of the computer system.

Data Formatting. Due to the time constraints of the contract, it was impossible to format the data acquired by the F.S.U. computer and to provide it to the subcontractor in time for testing the research and costing programs to be run on the 6400. (The data was manually keypunched and the programs tested on the subcontractors own computer). However, the major steps for providing this data by utilizing current data management programs which have been developed at the F.S.U. CAI Center may be described.

Every response entered by a student is automatically recorded by the 1500 system on magnetic tape. At the end of each day, these data records from a great variety of courses and students are sorted into the separate courses and then sorted by students within those courses. A series of tapes from a number of days are then merged together to form a student history file. The operational management system will operate on this student file in order to format data for the 6400 programs.

F.S.U. and subcontractor personnel collaborated on the development of a master input record for the student file on the 6400 computer. The task record layout appears in Figure 13. It can be seen from Figure 13 that the formatted record for the 6400 student file system contains complete information on a single task for a trainee; i.e., a record would be written by the data acquisition system only when a trainee had completed his selected enablers and had received final evaluation for a task. When the record preparation program encounters an acceptable task evaluation response from a trainee, it will collect all his information on the enablers for that task, organize it in a fixed format, leaving those enablers which were unattempted blank, and accumulate information in terms of number of passes at the task evaluation. These completed task records will then be written to a new tape which will be submitted to the 6400 programs in order to be loaded into the master file for later use with the research and costing programs.

Because the volume of data for the three-week prototype was manageable for keypunching purposes, transcribed copies of the trainees' task data sheets were provided to the subcontractor in order to immediately obtain real data for tryout in the research and costing programs. However, the sort and merge techniques currently available on the F.S.U. 1500 system provide the model for future preparation of student records. These records will be sorted daily and merged once a week into a file. This file will be interrogated by a record preparation program, which will write fixed format records which will be made available for entry into the master file by the 6400 computer. Data not ready for such formatting will be retained and merged with data coming in during the following week. These formatted records will then be read into the programs prepared by the sub-contractor and available on the 6400. There they would be placed in the master file to grow as

ADP RECORD LAYOUT

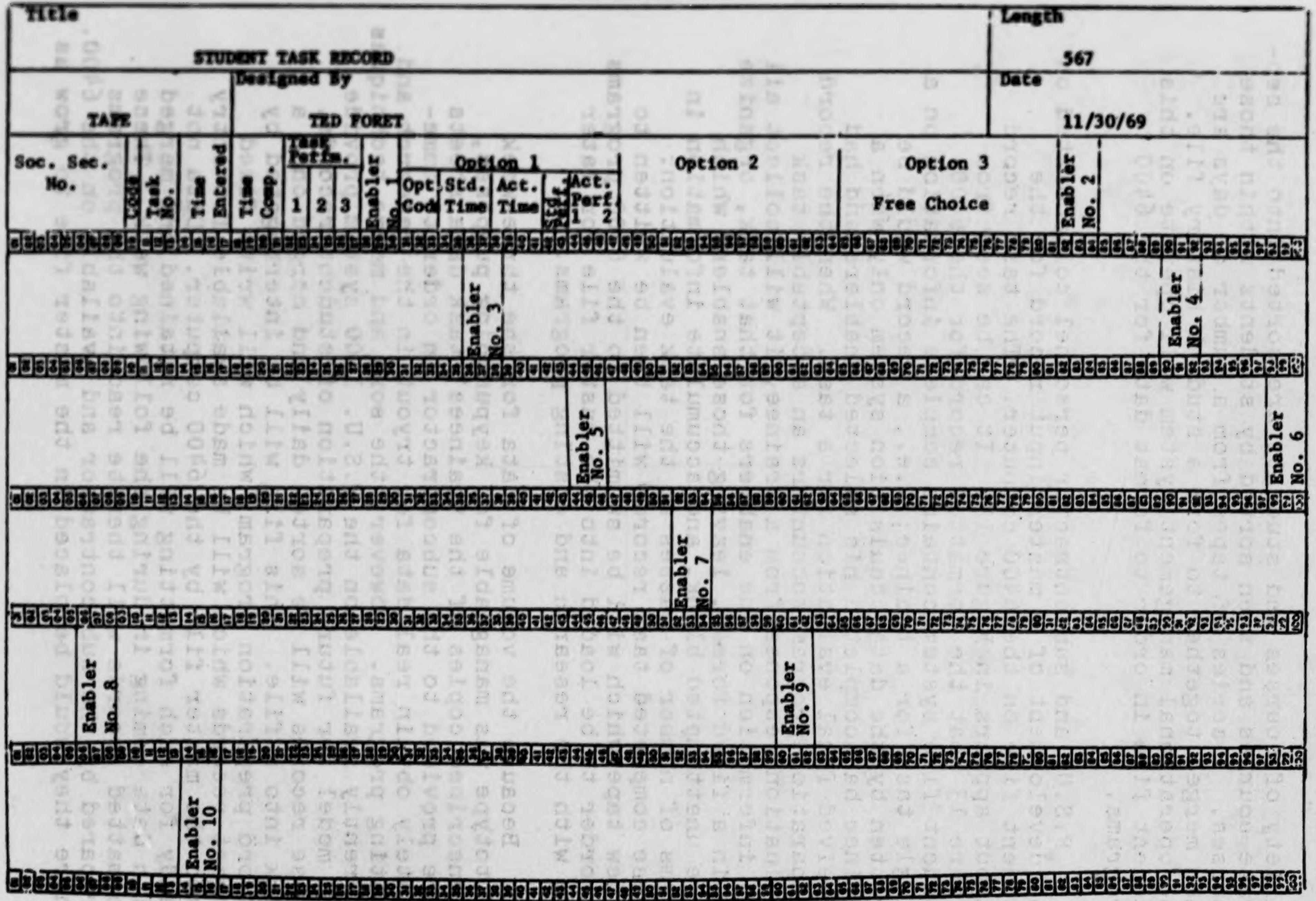

Title
STUDENT TASK RECORD
Length
567
Designed By
TAPE
TED FORET
Date
11/30/69
Soc. Sec. No.
Code
Task No.
Time Entered
Time Comp.
Task Perfm.
1
2
3
Enabler No. 1
Option 1
Opt. Code
Std. Time
Act. Time
Std. Perf.
Act. Perf. 1 2
Option 2
Option 3
Free Choice
Enabler No. 2
Enabler No. 3
Enabler No. 4
Enabler No. 5
Enabler No. 6
Enabler No. 7
Enabler No. 8
Enabler No. 9
Enabler No. 10

FIGURE 13

the students progressed through the curriculum. They would then be available for usage by counselors, curriculum designers, researchers and cost analysts.

Long Range Research and Planning System

Introduction

As indicated in the general introduction to this chapter, a decision was made that during the feasibility study two computer systems would be utilized within the total management configuration. The first system served primarily as the data acquisition, testing and formatting system. The programs and data for long-range research in planning and costing were developed for the larger computer configuration, the Control Data Corporation 6400 at F.S.U. These programs require relatively large data storage devices, rapid retrieval capability and high speed printers. Therefore, the purpose of this long range research and planning programming capability was to devise programs which would serve the variety of users within the total elementary model program. Five such users have been identified: (1) counselors, (2) researchers, (3) program managers, (4) curriculum designers, and (5) cost analysts.

Procedures

With the primary users of the long-range system in mind, the staff and sub-contractor personnel agreed upon the formatting and output requirements for such a system. All of the information dealing with the costing system appears in the next section of this chapter, while the programs which are related more directly with research and planning will be described here.

The general input format for trainee performance data was described in Figure 8. It was the staff's intent that all the information on one trainee on one task would be contained on one data sheet, i.e., this one sheet would provide all the information which would be needed to exercise a variety of programs which would constitute the long-range research capability of the 6400 system.

After agreeing on the input format, discussions were then held with regard to the substance of the output from the series of research programs. Concern was shown not only for attempting to anticipate the needs of the various users within the system, but also to format the output information in a form which would be maximally usable by these personnel. However, even with these precautions, it must be recognized that the formatting of the output sheets can only be considered tentative at this time. Only through experience in actual utilization can sheets be revised and changes made to the programs in order to maximize the usefulness of these programs.

Results

Appendix C contains sample output/printout formats from the various programs which comprise the long-range research and planning complex of programs. In this section, the usefulness of these reports is discussed. Although tentative as suggested above, they are based on actual data collected on the nineteen trainees who participated in the prototype study.

Counselor Programs. Since the counselors and trainees alike will have a master booklet describing the various tasks, enablers and options which exist within the program, Printout 1 initially will be useful to the counselor as he reviews the progress of the trainee. The program shows the sequential performance of the trainee on the various tasks, and the enablers and options which he has chosen as he progresses through the program. The trainees' progress can be assessed not only in his task evaluation performance, but in terms of the time required to complete the task, the number of times he must attempt it, and the general, overall lapsed time required by him to proceed through the program.

It is anticipated that Printout 1 will be utilized in conjunction with knowledge of the trainee's background and his interests as expressed in individualized counseling sessions in order to provide further counseling on tasks in the total program. It is the intention that such printouts will be provided only periodically and each printout will not replicate each preceeding one, but will contain new information.

Printout 2 will also be available to the counselor for assisting the trainee in his selection of various options within task enablers. The printout indicates, for the individual trainee, his average time and performance, and selection preferences for the various types of media sources within the array of options available to him. This should give the counselor some insight into the type of materials which seem to work best with each particular trainee. It may also serve the purpose of assisting in the diagnosis of individual learning difficulties which the trainee may be exhibiting.

Research Programs. It is often difficult to identify the precise needs of a researcher, but in this particular case, at least the researcher may be defined as someone other than a counselor, program manager or curriculum designer. His interests could be quite varied and might be encompassed within the range of programs described here or he might need an entirely different set of programs to achieve his needs from the data base. For example, already described Printouts 1 and 2 might be of interest to him. However, it is more likely that the printout numbered as 3 would be most representative of the kind of program that he would find most useful. It represents the printout from a generalized information retrieval program in which the researcher can specify the variable, and the values of that variable, upon which he would like to select information. For example, in the printout shown, the researcher has identified "the location of the basic studies program" as the basis for selection. The printout shows that he further selected only trainees who are junior college transfers. Summarized performance to date on the various tasks, enablers and options, average time and the number of trainees who have completed that task are indicated. The basic advantage of this program as shown in Printout 3 is that it can utilize the background information on students as well as their current performance in order to select out the relevant data. Longitudinally, it will also be possible to select on the basis of data gathered on a post-program basis. This capability should be a great advantage to the researcher.

The programs such as that shown in Printout 4 should also be of value to the researcher. Printout 4 shows a summary of trainee performance over tasks on a variety of media. This information could lead to further hypotheses which would be investigated through particular selection techniques as demonstrated in Printout 3 above.

Management Programs. A program manager's interest will for the most part center on analyses which facilitate fiscal management, allocation of human and material resources, and program effectiveness as evidenced by time and quality dimensions of trainee performance when compared with the instructional alternatives available. For these purposes, printouts such as number 3 where a general selection technique is utilized, or printout number 5 as shown can be of value. Printout 5 is of interest because it shows, both by name and by frequency count, the last task completed by each student in the program. A quick listing of this sort indicates to the manager exactly at what point at any time the trainees are in the program. This is an excellent method by which whole series of time projections can be made in terms of demands for both human and physical resources within the program. Eventually, as information accumulates, programmed projections of estimated resource needs and anticipated trainee completions can be made. More information in terms of management techniques and utilization of the computer are presented in the section on cost analysis.

Curriculum Designer Programs. The curriculum designer will have a continuing interest in obtaining data as a form of feedback in terms of effectiveness of specific materials used by the trainees and of the program itself in terms of the extent to which objectives are being met. The printout such as number 6 should be considered a device for the initial screening of the various instructional materials in order to assess their effectiveness. The printout indicates, by task, the options which are chosen with what frequency, under each of the enablers. In addition, the study time and average performance are also indicated. This is far from the complete information which is available and can be utilized for revision purposes, but it provides an initial source for determining problem areas which need immediate attention.

Additional data will be obtained in the resource center through various evaluation techniques built into materials by the designer. Many of the materials obviously will utilize trainee response techniques, i.e., materials which require responses from a trainee. These data can be summarized and made available to the designer by the management system. In addition, the curriculum designer may also find Printout 3 from the generalized information retrieval program of great value in terms of assessing the effectiveness of various materials with various kinds of users.

Additional Considerations

Two additional features of the long range research and planning programs should be pointed out. The first is the creation of a file which includes data on the background and aptitudes of each trainee. This information will be integrated with the student's performance data--both in the program and in the portal school--to provide a complete description of the student from his point of entry to his point of departure from the program. Background information will also obviously be useful in the selection of data for subsets of the population for research purposes (as displayed for example in Printout 3).

The second feature of note in the research and planning system is the program description file. This file includes a complete numeric identifier and verbal description of every task and enabler in the total program. In addition, the three options under each enabler have a numeric identifier. This file will be of great value not only in providing labels for reports, but also for summarizing student performance on various types of resources and cost/benefit analysis of various resources.

This section has indicated that programs which require large scale data storage and retrieval capability have béen developed through interaction of the project and sub-contractor staff in order to provide information for counselors, researchers, managers and curriculum designers who would all be working concurrently in the operation of the elementary model. All of the performance data for these users is provided through a single task data sheet record which is formatted and provided to the large scale computer. When interfaced with data files containing records of student history, a description of the program curriculum and basic costing information, a total program model is created on the basis of which a vast array of printouts is possible.

Samples from the potential array have been described along with their relative usefulness to the various users. It is acknowledged that these formats are to be considered only tentative at this time and will obviously be revised upon experience gained in an operational program.

Because of the particular importance of fiscal management procedures to the operation of any program developed to model specifications, the following section of this chapter will detail uses of this total set of data files for fiscal management.

Fiscal Management

Introduction

The Phase I document suggested a rationale for the fiscal management parameters of this project. However, an extensive investigation during the feasibility study has produced an extension of that rationale which can be considered the basis for developing a modern fiscal management system which facilitates the functions of planning, programming, and evaluating, and thus improves resource allocations. Appendix E contains a position paper which presents this rationale, along with detailed information on the fiscal strategies used in the prototype.

As discussed in Chapter II, the instructional program is organized on the basis of teaching performances rather than around the knowledge content of the various disciplines. Therefore, a program approach to training is necessary which, by definition, would have to transcend departmental boundaries. Thus, the application of modern fiscal practices, such as planning-programming-budgeting-systems, flexible budgeting, and standard cost accounting, is essential.

Focus of the Fiscal Management System

Based upon discussion with the curriculum developers concerning the need for accountability of such diverse resources as instructional materials in formats ranging from pictures and filmstrips to computer-assisted instructional programs, and the various time requirements of faculty, administrators, staff personnel and graduate assistants, it became evident that the cost system must differentiate between four major elements of cost; materials, labor, variable overhead and fixed overhead. The project staff desired a system to accumulate and analyze costs for as short a period of time as three weeks, yet capable of infinitely gathering cost data and automatically updating the budgetary appropriations and allocations as a function of the relationships between the actual cost and effectiveness data captured.

The fiscal management system developed and tested during Phase II was purposely designed to be as flexible as possible relative to the various methods and objectives of financial accounting. These features were built into the system by means of the definitions applied to each of the four elements of cost (See Appendix E). These costs in the form of labor, materials, variable overhead and fixed overhead are concerned only with direct operations. Capital cost items such as equipment and facilities were not included since it was the considered decision of the fiscal analysts working on this project that capital outlay accounting should be kept separate from operational accounting. Also, since costs for development and start-up greatly exceed anticipated operating budgets, a decision was reached to account for these costs separately from the operational management system, and consequently, they were not prorated to the cost centers during the prototype test of the system. In the future, however, capital and/or developmental costs can easily be included should that approach be preferred by a system user.

The justification for embarking upon the building, testing and implementing of the budgetary and cost sub-system is essentially threefold: (1) Data were needed on which to base feasibility decisions and to allow reasonable cost estimates of future operations; (2) The acceptability of standard cost accounting needed to be tested in an educational environment; and (3) The characteristics of fiscal accounting for cost-effectiveness purposes which can facilitate future development of a total accounting system needed to be ascertained.

The remainder of this section contains a flow chart of the fiscal management system (see Figure 14), a

OVERVIEW OF FISCAL MANAGEMENT SYSTEM

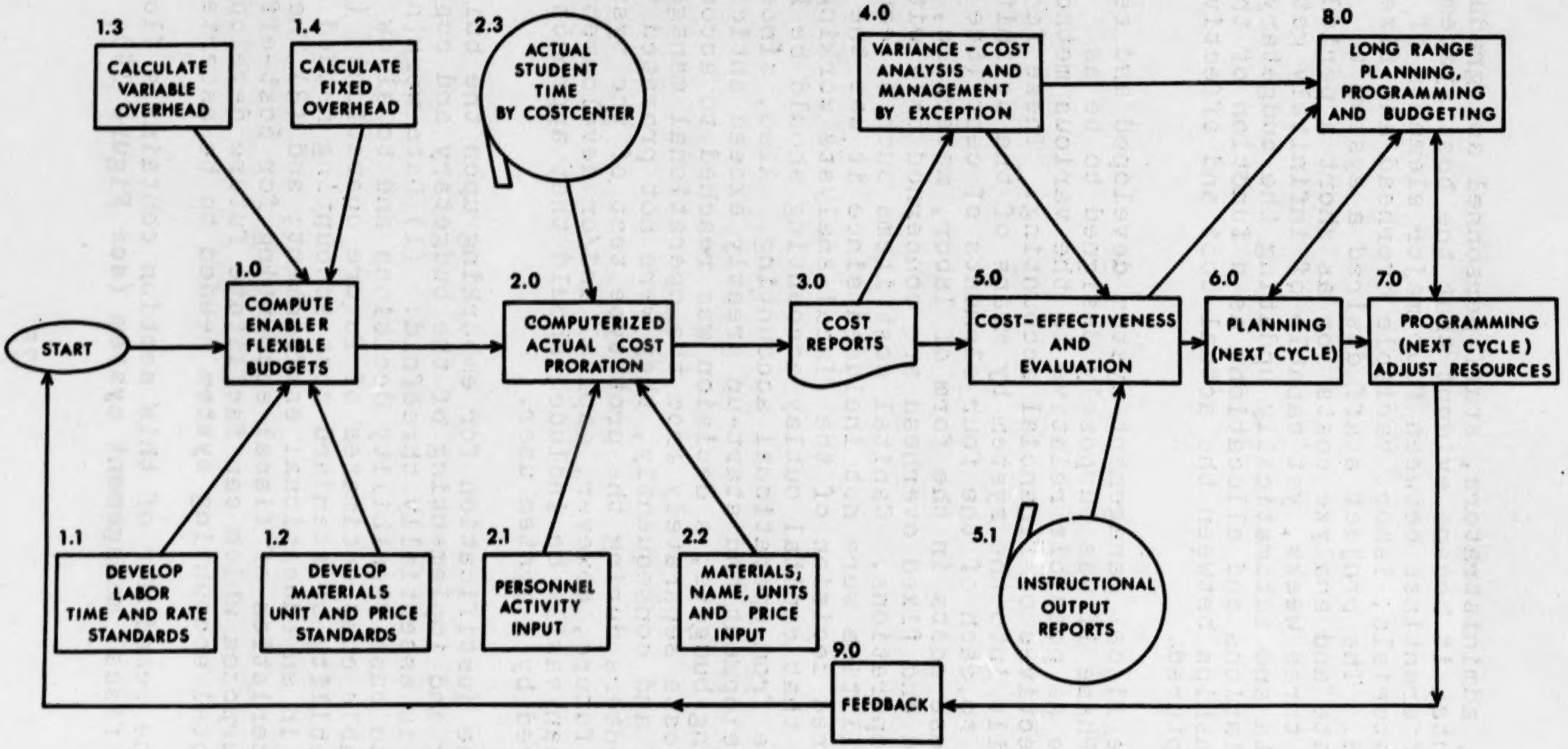

1.3
CALCULATE VARIABLE OVERHEAD
1.4
CALCULATE FIXED OVERHEAD
2.3
ACTUAL STUDENT TIME BY COSTCENTER
4.0
VARIANCE - COST ANALYSIS AND MANAGEMENT BY EXCEPTION
8.0
LONG RANGE PLANNING, PROGRAMMING AND BUDGETING
START
1.0
COMPUTE ENABLER FLEXIBLE BUDGETS
2.0
COMPUTERIZED ACTUAL COST PRORATION
3.0
COST REPORTS
5.0
COST-EFFECTIVENESS AND EVALUATION
6.0
PLANNING (NEXT CYCLE)
7.0
PROGRAMMING (NEXT CYCLE) ADJUST RESOURCES
1.1
DEVELOP LABOR TIME AND RATE STANDARDS
1.2
DEVELOP MATERIALS UNIT AND PRICE STANDARDS
2.1
PERSONNEL ACTIVITY INPUT
2.2
MATERIALS, NAME, UNITS AND PRICE INPUT
5.1
INSTRUCTIONAL OUTPUT REPORTS
9.0
FEEDBACK

FIGURE 14

narrative explanation of this flow chart, a flow chart on the total management system (see Figure 15), results of the prototype fiscal management system, and a discussion of the feasibility of the fiscal management system.

Explanation of the Flowchart

In the several paragraphs that follow, numerals refer to specific elements within the flowchart shown in Figure 14. Numerals 1-4 represent processes of the fiscal management system actually tested with prototype data. Processes represented by numerals 5-9 were not field tested but have been designed and are included in the flow chart as links necessary to complete the iterative fiscal management system.

1. Enabler Flexible Budgets. The initial process of the fiscal management system is the calculation of the enabler flexible budgets (See Appendix F). After planning with curriculum personnel it was decided that the scope of the budgets must include all identifiable operations within the program where expenditures could conceivably be incurred. Therefore, the notion of cost center was developed to indicate the units of activity that would involve monetary costs. Instructional options, pre-task counseling, and post-task evaluation activities are designated as cost centers in the prototype. Each cost center is composed of the following four elements of cost: labor, materials, variable overhead, and fixed overhead. Since the capability and effectiveness of the fiscal management system is dependent to a large degree on the manner in which each of the elements of costs are defined, a comparison of prototype definitions and textbook definitions is shown in the position paper in Appendix E.

The parameters of the enabler flexible budgets are derived from the development of three distinct budgets for each cost center. These budgets are labeled Minimum, Most Likely and Maximum with the variable factor in each primarily being the number of trainees expected to choose the cost center. For the prototype field test, the Most Likely Budget represented a utilization factor of ten (10) trainees while the Minimum and Maximum budgets reflect densities of zero or very near zero trainees, and twenty trainees, respectively.

1.1 Labor Time and Rate Standard. Again based on the prototype operation, the creation of labor time and rate standards resulted from a coordinated effort among all members of the project and the cost analyst. Based upon estimations on the amount of time that would be needed for each cost center for the varying levels of trainee expectancies, these time estimates (expressed in hours) when multiplied by a labor value, formed the foundation for labor costs.

1.2 Material Unit and Price Standards. Material unit and price standards followed the same basic format as labor standards. After a conference with the curriculum developers, material unit and price standards were synthesized for the three levels of budgets for each cost center.

1.3 Variable Overhead. As a result of communication between members of the project and their estimations of labor and material requirements for each of the cost centers, it was anticipated that a considerable amount of time and materials would be devoted to the trainees on an informal basis. That is, such time and material could not be associated directly to any of the predefined cost centers, but rather was more closely related to total student time expectancies for each cost center.

Variable Overhead Formulae

Estimated Number of Student Trainees per Cost Center (0, 10, 20)	X	Estimated Time to Complete Cost Center	=	Total Standard Student Time per Cost Center
Standard Student Time Per Cost Center	X	Rate ($5,$7,$9)	=	Total Variable Overhead per Cost Center

These formulae are used to calculate the standard variable overhead for the Minimum, Maximum and Most Likely cost center budgets. The total standard student time is a direct function of the estimated number of student trainees multiplied by the expected time required to complete each cost center (which includes evaluation time). Total standard student time is then multiplied by a rate which yields the total standard variable overhead amount for the three budget levels for each cost center. The rate is a pre-determined constant amount for each budgetary level.

1.4 Fixed Overhead. In the field test of the prototype, another undefined area within which considerable costs were anticipated was the personnel activity and material related to program and student administration. Therefore, for purposes of the prototype Fixed Overhead refers to those expenditures which are utilized for the administration and management of curriculum, program, students and financial data.

The dollar amount for Fixed Overhead was calculated in total for Minimum, Most Likely and Maximum Budgets. These total estimated program amounts were then converted into standards for each cost center by means of an equal distribution to each budgeted cost center.

2. Computerized Actual Cost Proration. After each of the enabler flexible budgets was calculated and entered into the computer, the second major process of the fiscal management system was the computerized proration of actual cost data. Since all cost related computer operations were off-line batch processed, the entry of actual cost information occurred at the completion of the three week prototype. These costs, however, could be entered at any set interval in total operation setting.

The format in which actual cost data was collected (See 2.1 and 2.2) was meaningless for management purposes. However, when they were entered into the computer system, they were prorated back to the cost center which initially incurred the cost. Upon accumulation of actual cost information for each cost center, the stage was set for the generation of reports and a complete analysis of the variances between budgeted and actual costs.

2.1 Personnel Activity. The vehicles for capturing labor portions of the actual cost data were personnel activity sheets (See Appendix F). These were distributed to all members of the prototype staff and each person was requested to complete and submit a sheet every three days during the three week prototype. These sheets were the basis for entering actual labor cost data into the computer system.

2.2 Materials-Name, Units and Price. Materials data were gathered by the person in charge of the resource center and it was his responsibility to record and submit the name and number of units of all materials which were used during the prototype. This information, in the form of material input sheets (see Appendix F) like the activity sheets, was used as a basis for entering actual material cost data into the system.

2.3 Actual Student Time by Cost Center. The total amount of time each trainee devoted to a cost center was already stored in the curriculum file (see previous section). Since actual trainee time was one factor included in the proration of the actual cost data to each cost center, the curriculum file was now interfaced with the cost file.

3. Cost Reports. Samples of all the cost reports, herein referred to as printouts, are shown in Appendix G. Cost printouts appropriate to an analysis of the prototype, as well as the anticipated operation of a full scale program, were actually generated on the basis of data gathered in the prototype. These printouts became essential management tools in the hands of the following program personnel: cost analyst, curriculum personnel, program managers, researchers, and institutional funding control personnel. The title, users, and purposes of these printouts follow.

Printout	Users	Purposes
Actual Cost Proration	Cost Analyst	Auditing of Direct Cost
Cost Center Profile	Faculty(Curriculum Developers),Program Managers,Cost Analyst, Evaluators.	Analysis of Instructional Options, Pre-Task Counseling, Post-Task Evaluation Costs
Free Choice Option Profile	Program Managers, Curriculum Developers, Cost Analyst	Evaluation and analysis of actual costs and usage of free choice instructional options
Enabler Report (Labeled as Sub-Task Report)	Program Managers, Curriculum Developers, Cost Analyst	Evaluation and analysis of cost centers via exceptional actual cost relative to standard cost

Printout	Users	Purposes
Task Report	Program Managers, Curriculum Developers, Evaluators, Cost Analyst	Evaluation, analysis and control of enablers via cost variances
Program Cost	Program Managers, Institutional Funding Control Personnel, Researchers	Institutional research and control; External reporting
Time and Cost by Cost Center	Researchers, Faculty Counselors, Program Managers, Cost Analyst	Analysis and evaluation of effectiveness of cost center in terms of cost; Research
Student Profile	Program Managers, Faculty Counselors, Researchers	Analysis and research

4. Variance Cost Analysis and Management by Exception. (See printouts 4, 5, 6 in Appendix G.) The concept of "management by exception" is extremely important to effect evaluation, control and analysis of an operating program with a large number of tasks. The "by-product" reports of variance analysis for each task enabler and instructional option provide an explanation of all deviances from the original flexible budgets. Large differences from the original budget can then be compared to the effectiveness of instructional outcomes in terms of the greater or lesser costs than originally expected.

5. Cost Effectiveness and Evaluation. Although not utilized in the prototype data because of the small number of trainees, as such a system becomes operable, data will be available on which programming decisions can be reached in terms of optimizing time, cost and performance factors associated with alternative instructional options.

5.1 Instructional Output Reports. The instructional outputs which are stored in the curriculum file will be interfaced with cost data to provide the effectiveness information for cost-benefit analysis. At this juncture there is actually a synthesis of cost and effectiveness outputs. The product of the analysis of both sets of data provides the requisite information for long and short range planning and programming.

6. Planning. Planning for the next cycle will be based on the analysis and evaluation of the programmatic period just completed. The short-range fiscal and programmatic planning is then converted into the desired programs for the next programmatic period. Information is also fed into the long-range planning, programming and budgeting process.

7. Programming. Programming is the process of designing programs and strategies to permit the fulfillment of organizational plans. Programs should be consistent with long-range planning.

8. Long-Range PPB. Long-range planning, programming, and budgeting is an adjacent but integral part of the interative periodic cycle. Being a never-ending process based upon the feedback and evaluation from present operations and external goals and constraints, it is included in the flow chart for illustration of the entire PPBS process. Since it is the intent of this project to devote a concentrated effort to this process during the development of a full-scale program, considerable attention is given to this aspect in the position paper in Appendix E.

9. Feedback. The flow of the fiscal process shown in Figure 14 is enclosed by a loop. The route of the prototype was actually a single pass through this loop. Assuming the prototype were an annual operation, and further, that the programming and adjusting of resources for the next year had been completed, then the subsequent process would again be the computation of enabler flexible budgets.

Total Management System

The conceptual integration of the fiscal management system into the total management system appears in the flowchart in Figure 15. It is important to note the inter-relationships of the instructional and curriculum sub-system with those of the fiscal sub-system. Periodic information reported from both sub-systems are synthesized in the effectiveness data analysis process. The effectiveness of the instructional program is evaluated and analyzed

TOTAL MANAGEMENT SYSTEM

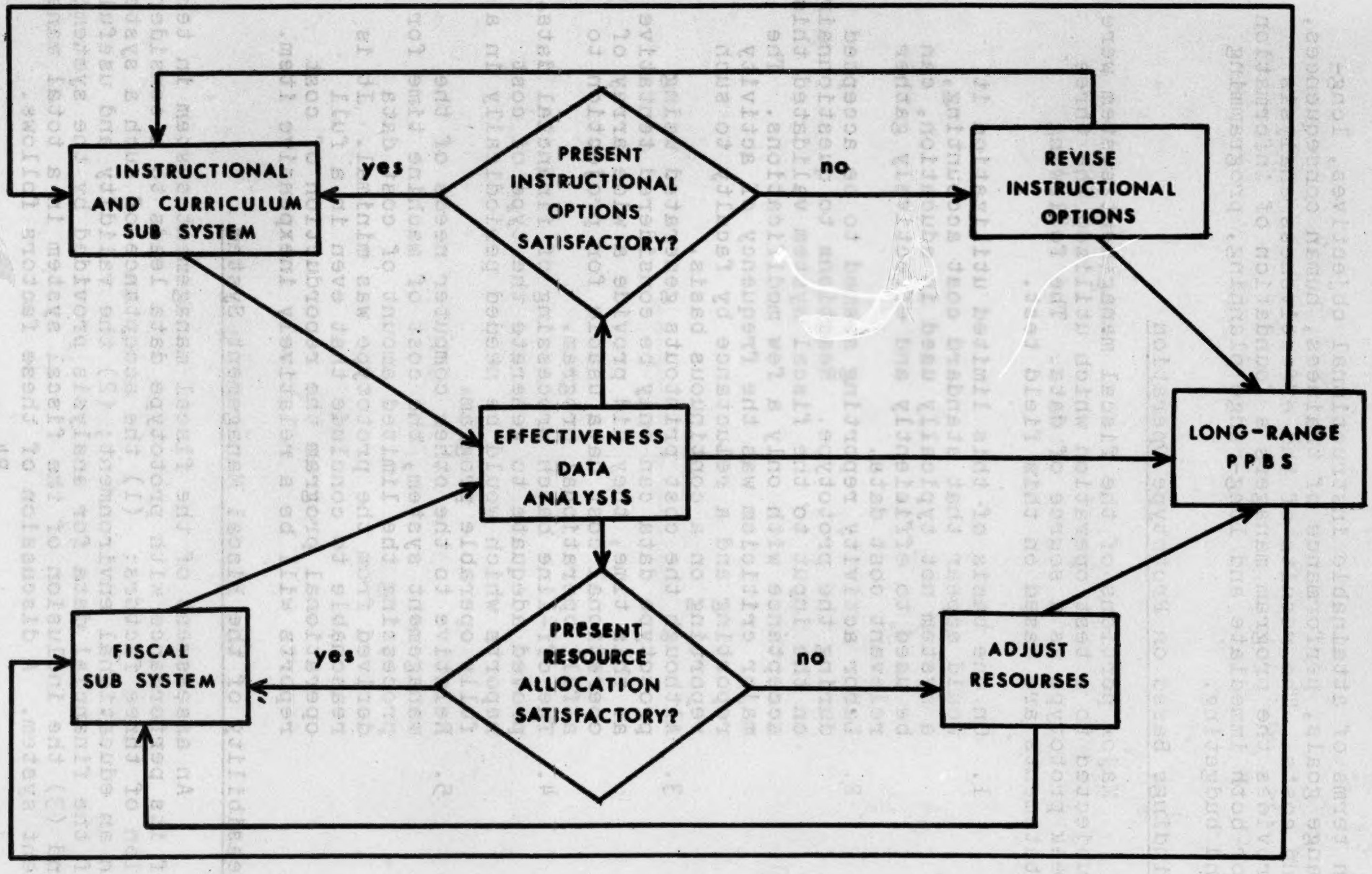

INSTRUCTIONAL AND CURRICULUM SUB SYSTEM
yes
PRESENT INSTRUCTIONAL OPTIONS SATISFACTORY?
no
REVISE INSTRUCTIONAL OPTIONS
EFFECTIVENESS DATA ANALYSIS
LONG-RANGE PPBS
FISCAL SUB SYSTEM
yes
PRESENT RESOURCE ALLOCATION SATISFACTORY?
no
ADJUST RESOURSES

FIGURE 15

in terms of attainable instructional objectives, long-range goals, performance of trainees, human consequences, and costs. The results of the effectiveness analysis provides the program managers a foundation of information for both immediate and long-range planning, programming and budgeting.

Findings Based on Prototype Operation

Major portions of the fiscal management system were subjected to a test operation which utilized the three week prototype as a source of data. The following statements are based on this field test.

1. On the basis of this limited utilization it would appear that standard cost accounting, a system not typically used in education, can be used to efficiently and effectively gather relevant cost data.
2. Labor activity reporting seemed to be accepted during the prototype. Reactions to questionnaires on the input to the fiscal system validated this acceptance with only a few modifications. The major criticism was the frequency of activity reporting and a reluctance by faculty to such reporting on a continuous basis.
3. Although the cost printouts generated using prototype data can only be considered tentative at this time, they did provide a wide array of operational cost data usable for projection to a full operational program.
4. The off-line batch processing of financial data proved adequate to generate the type of cost reports which would be needed periodically in a fully operable program.
5. Relative to the other computer needs of the management system, the cost of machine time for processing the limited amount of cost data derived from the prototype was minimal. It is reasonable to conclude that even in a full operational program the reporduction of cost reports will be a relatively inexpensive item.

Feasibility of the Fiscal Management System

An assessment of the fiscal management system in terms of its performance with prototype data leads to a consideration of three factors: (1) the acceptance of such a system in an educational environment; (2) the validity and usefulness of the financial data for analysis provided by the system; and (3) the inclusion of the fiscal system in a total management system. A discussion of these factors follows.

1. Indications on the acceptance of activity reporting suggests a modification of the procedures used in the prototype. This problem will diminish in an operating program when scheduling procedures will provide much of personnel activity information; therefore, only periodic sample activity reporting is foreseen. The designed movement toward greater utilization of instructional materials and equipment should shift the emphasis of the fiscal management system more toward material costs and utilization. Although capital outlay costs for materials and equipment were not included in the cost data of the prototype, the fiscal management system was designed to account for these items.
2. Using data derived from the prototype, the fiscal management system presented a valid financial picture of actual current operations. While financial data can be construed in many ways, when the rationale and definition of the prototype fiscal management system were made known to the users of the cost printouts, there appeared to be minimal problems in their interpretation and use.
3. As shown in the flowchart in Figure 15, the real value of the fiscal management system is dependent upon its integration into a total management system. When this occurs, fiscal data can then be compared and weighted against other effectiveness data for more meaningful decision making. An example of the integrative use of cost data with other factors can be seen in Chapter VII when costs as derived from the prototype lead to a projected change in resource allocation patterns.

Future Developments

One of the primary outcomes of this feasibility study has been the opportunity to re-evaluate the total range of functions which should be available on the computerized management control system. This analysis of functions has utilized the data estimates from the prototype, as well as research experience gained during the past four months through the administration of an on-line computer managed instruction course at the CAI Center.

Instructional Management

Upon concluding analyses of the data collected during the prototype field test and the CMI course referred to in the above paragraphs, a number of generalizations seem relevant.

1. In the original proposal and in the prototype study itself, a dual computer system concept was optimal for several reasons: (a) security of the data base, (b) capability to produce timely and appropriate reports, and (c) the impression that most of the stand-alone computer system's time would be required for data acquisition and instruction. However, the prototype study suggested that much less reliance need to be placed on the second, larger computer in the system. For example, if data acquisition, enabler quizes, and CAI are brought together into an enlarged CMI component, a far more powerful use can be made of a stand-alone system. When a trainee takes an enabler quiz on the computer terminal, such items as his enabler performance and date of completion can be used automatically to update that particular trainee's performance data file. Such automatic data transfers would be equally appropriate when materials were presented via CAI. Not all relevant data would normally be directly acquired through trainee interaction with the computer because certain enabler and task evaluations could not and should not be limited to computerized testing techniques. It is, therefore, being proposed that small optical scanning devices be used to collect the results of these off-line evaluations. (These same scanning devices can be used for entering data into trainee history files and cost center files.) This enlarged concept of CMI decreases the amount of computer time dedicated solely to data acquisition.

If the stand-alone system will not be required solely for data acquisition and instructional purposes, it is then possible to project the use of the system for certain reporting functions. For instance, at least two small files could be retained within the stand-alone system: (1) a trainee file, which includes trainee number, last task completed, number of tasks completed, total of scores on all task evaluations and time in the program; and (2) a task file, which includes number of trainees completing the task, total of scores on all task evaluations and total of all times on tasks. As each record on a completed task is formatted for the permanent file, it would be a relatively simple matter to up-date these restricted trainee and task files.

These files could be used to produce weekly reports on the current status of each trainee and each task. Such reports could be compared with previous reports to note changes. Techniques for "exception" reporting would also be implemented at this point. The formatted tape could easily be used to print a record of all trainee progress during the week.

Because of these general findings, much less emphasis is now placed upon the large research computer-analysis and report-producing functions. However, as indicated in a later section, the larger research computer concept is not completely discarded.

2. The fact that counselors will need data which they can readily understand in order to counsel in an effective manner, was reinforced by the prototype. Projections in Chapter VII will suggest that it will not be economically possible to maintain the same 1:10 faculty counselor:trainee ratio utilized in the prototype study. This will probably dictate two types of counseling modifications. The first is counseling by exception. Progress-performance ratios can be computed to provide exception reports on the basis of which those trainees needing immediate human counseling can be identified. The second, a team approach to day-to-day counseling is discussed in Chapter VII. With adequate computerrreports, counseling can be available efficiently at times of greatest need by all trainees.

3. With 1000 students interacting with the computer at any time, and a realistically limited number of counselors, the interaction with a computer may serve a more useful psychological purpose than originally expected. An interactive, on-line computer system that asks questions and responds with another question or comment is, in fact, acting as an additional source of "personalization" in the program. Consequently, student trainees who have complained of lack of interactive experiences with meaningful feedback, may be provided with this additional element of interaction through the use of computer terminals and the employment of CAI type dialogue in this man-machine context.

This generalization seems to be indicated from the reactions of trainees during the three week trial to such attitude preference statements as; I prefer to plan my own schedule (the trainees agreed); it is the teacher's responsibility to see to it that I learn the subject matter of the course (they disagreed); and I would recommend this type of learning experience to my friends (they agreed). In essence, responses received during the trial to attitude statements (considered in greater detail in an earlier section) lead to the general conclusion that interaction with a terminal may well serve as an important secondary interactive element within the model program.

4. The prototype indicated that scheduling should be given serious and perhaps primary consideration in future developments. Keeping track of 1,000 students is a big problem; which ones want what, when and where, may well be the most crucial element of the whole model. Herein, it is conceptualized that a simplistic matrix system would be most practical, manageable and probably serve the model best. Under such a system, a student would be responsible for entering his proposed schedule for a period of one to five days, and, if openings permitted, confirmation of the proposed schedule would be received by him immediately. When, because of limitations of resources, a particular time slot is filled or otherwise unavailable, a vector could be presented (if requested) indicating the time or times during the week that were available for a particular activity.

Essentially this system would operate on a first come, first served basis. Scheduling in this manner is almost essential in order to know what the students expect to do, and to insure that the resources will be available to them. Individual student scheduling in a real time environment with immediate knowledge of availability is not only manageable but appears to be quite desirable.

Fiscal Management

Future developments in the fiscal management system will include: more efficient techniques for accumulating actual cost information; possible restructuring of report formats; and incorporation of such new financial accounting methods as single transaction matrix accounting.

Accumulation of actual cost data by methods other than the input sheets shown in Appendix F seem appropriate for a completely automated system. One idea is the direct entry of such data into the CAI terminals for storage and periodic retrieval for off-line batch processing. Another possibility is the use of mark sense cards or sheets which would be directly entered into the off-line computer by means of an optical scanner.

As previously stated, the report formats are subject to revision based upon the requirements of the various users of cost data. This process is relatively minor and no problems should be encountered.

As long as the training program is operating within the framework of an institutional structure which has a higher level financial accounting facility, no changes would be needed in the present fiscal system. However, if a higher accounting facility is not available, the single transaction concept of matrix accounting would not only meet the legal requirements for appropriations and fund accounting, but would provide accounting data for the various program administrative needs. Under a single transaction system, each piece of information enters the system only once, and, through a series of pseudo-matrices within the computer, performs all needed accounting functions.

Proposed System and Its Functions

On the basis of the analysis of both the prototype study data and the continuing developments in computer technology, it is proposed that the total computerized management system for the elementary model be capable of carrying out six specific functions. These functions will be composed of (1) computer managed instruction (CMI), (2) computer assisted instruction (CAI), (3) scheduling and counseling, (4) weekly reporting, (5) data formatting, and (6) long-range planning, research and costing. Each of these functions as it is now conceptualized is described below. The first five functions would be carried out by the stand-alone system which is dedicated for use in the model program. The sixth function would be conducted on a larger computer system.

Computer Managed Instruction. Although computer managed instruction has many definitions, the one primary characteristic which does seem to be agreed upon is that no instruction takes place in terms of an interaction between a student and a computer. The type of CMI system which is proposed here is composed primarily of a dialogue-like testing situation which will be provided for all enablers for which computer testing is appropriate. The purpose of testing at the enabler level will be both diagnostic, and to a certain extent, prescriptive, in order to prepare the student for the task evaluation session.

An additional function of the CMI system will be to automatically generate data records for the student and to insert these into the records file of the week's activities. Thus, the student will be relieved of the responsibility of simply entering progress data. It is clear that not all data will be acquired via direct student/terminal interaction; therefore, two inexpensive optical scanning devices will be interfaced directly into the computer system. Data collected in non-computerized evaluation sessions will be recorded on sheets and read by the scanners, and additional student data records will be generated.

Computer Assisted Instruction. The second function of the system would be what is considered conventional CAI; that is, a language will be made available which may be used to prepare instructional materials for implementation on the computer. A careful analysis of the instructional objectives for any task will be conducted before committing any learning activity to the relatively limited amount of time which will be available for CAI. It is now anticipated that certain drill and practice, and perhaps problem solving activities, will best utilize the CAI capacity of the system.

Scheduling and Counseling. This will provide the student with a dialogue-like interaction with the computer which will, on the basis of a limited student history file, provide the student with information on his own progress through the training program and assist him in making decisions about those activities which he should pursue. The purpose of this dialogue and information will be to build upon and enhance the human counseling which will be an integral component of the total program. It will be during this student/computer interaction that the student will schedule his activities for the following time period. A description of the proposed scheduling techniques was provided earlier in this section.

Weekly Records. The CMI, CAI, and counseling and scheduling functions are all directly related to the student/computer interactions. The fourth function, weekly records, is a capability which would provide information to counselors and program managers in a timely fashion. It is proposed that at the end of each week, as the student data records are sorted, merged, and prepared for standardized formatting, several data tables related to students and tasks be updated, summarized and made available to the counselors and manager.

These data tables will be based primarily on student progress during the week and reflect resource needs for the week ahead as indicated by the scheduling demand. Since these file structures will be primarily based on cumulative updating of information, they will be printed out on a weekly basis. The files can be made directly available to the counselors and manager through interaction at the terminal for interim reports.

Record Formatting. Although it is now being proposed that the stand-alone system take on more of the functions which had originally been delegated to the larger computer, it will still be necessary to format and block records which will be written on tape and made available for further analysis on a larger system. This activity will be done on the stand-alone system.

Long-Range Planning, Research and Costing. It is anticipated that programs developed by the subcontractor in the feasibility study, as well as other statistical programs, can be provided to researchers, curriculum developers and cost/benefit analysts. In general, any program which requires access to the entire data base will utilize the formatted student task records and the analysis will be conducted on the large computer system. Therefore, there would be a continuing requirement to format and store the data records emerging from the ongoing operational system.

Computer Equipment Recommendations. In order to carry out the sixth function listed above, a CDC 6400-like system will be required. In general, such a system should be scientifically oriented and include: 64 K core, 4 or more tape drives, a large disc or drum, and a high speed printer. Nearly any major university research computer should meet these specifications.

The computer management project staff has for some time been analyzing new low-cost equipment which could be effectively and efficiently programmed to execute the first few functions described above. The analysis of the capabilities of this new equipment clearly suggests that a variety of equipment is now available which could be utilized. No computer manufacturer, either large or small, currently has the computer software to provide the functions which have been described. However, based on the system's programming experience of programmers in the F.S.U. CAI Center, several of these smaller computers could have operating systems designed for them which would be more than adequate.

Listed in Figure 16 is suggested computer equipment which would be adequate for the system which has been described. Several manufacturers have such equipment which could be purchased for less than $250,000.

It is also of interest to project the operating costs, in terms of personnel who would be involved in the computerized-management system at an operational level of the magnitude described. Figure 17 shows a list of the number and type of personnel who would probably be required to run the system and to interface with a curriculum and instruction group.

PROBABLE COMPUTER EQUIPMENT

Number	Description
1	CPU with 8K word memory
1	8K word additional memory
1	Program protect and instruction trap
1	Variable base register
1	Stall alarm
1	Auto start
1	Index register
1	$60H_z$ Real time clock
1	High speed paper tape read/ punch Movable head disc
2	Digital I/O
8	External Sync attachments
16	ASCII modem interface
32	KSR-33
1	Cabinet
1	Power supply
2	Optical scanner
1	Line printer (300 lpm)
1	Magnetic tape control (9 track, 800 bpi)
2	Magentic tape unit (48 kc)
2	Nine track option

Figure 16

Projected Personnel and Salary Requirements for Management System

Number	Description	Monthly Rate	Monthly Total	Annual Total
3	Operators	500	1500	18,000
1	Operations Supervisor	600	600	7,200
2	Coders	400	800	9,600
4	Assistants	300	1200	14,400
1	Systems Programmer	1200	1200	14,400
1	Systems Manager	1500	1500	18,000
		Estimated Annual Personnel Cost		$81,600

Figure 17

CHAPTER V

INTER-INSTITUTIONAL COLLABORATION

The F.S.U. Model is designed to accomplish objectives which can be attained only by a network of institutions working in unison. Both the objectives of the model and the training program designed to attin them, therefore, rest heavily on faith in the ability of institutions to share the total task of training teachers. The purpose of this chapter is to identify the major components of the F.S.U. Model which require cooperative inter-institutional action, to describe the effort made to determine the kinds of action possible, to report the findings of these efforts, and to generalize to the extent that it seems justifiable on the basis of these findings.

Model Demands on Multiple Institutions

The successful development and implementation of the F.S.U. Model would rest as much on institutional cooperation as on any other single factor or condition. Design of the teaching model, selection and development of instructional materials, and competence of those who train are basic ingredients of the model. These are primarily the responsibility of the university. But these factors could all be present at maximum strength, and the program as projected in the model could still be far from implementable. The F.S.U. three-phase program model (See Figure 1) cannot be conducted by or within the confines of a College of Education alone. The components which give the model completeness can be made effective only through inter-institutional cooperation. Each activity which requires a network of institutions to make it effective, is discussed in the following pages with the nature of institutional collaboration which each would require.

Underclass Study

Specifications call for a comprehensive program of general education plus pre-professional and behavioral sciences study during the first two college years. The pre-professional part of underclass study is designed to accomplish two things: (1) to provide trainees with experience on the basis of which they can decide whether they wish to prepare for teaching, and on the basis of which the university can decide whether it wishes to accept them, and (2) to gether data on trainees to be placed in the computer system for future use in relating performance to productive factors.

Programming specific underclass studies presents a significant problem to many universities and colleges, particularly state supported institutions, because a clear trend exists toward increasing entry into senior institutions after two years in a public junior college.

For example, in 1969, fifty percent of the students entering teacher education at Florida State University first attended a public junior college. This percentage is predicted to rise to eighty percent by 1975. But, students at junior colleges do not matriculate to a single institution. Thus, pre-professional programming must meet not only the model specifications, but be acceptable for entrance at institutions not offering the model program.

Schools as Part of the Institutional Network

Public schools would have to be deeply involved as a partner in the institutional network in order to develop and implement three important features of the F.S.U. Model: (1) The "portal school" which might be considered as a hybrid institution with both training and public school functions; (2) Immediate application of theory to practice which requires a flexible access to pupils; and (3) "Early awareness-involvement" experiences, a label which implies that access to on-going elementary school instruction will be needed for trainees, particularly during the pre-professional stages of their program.

The "portal school" as conceived in the model would be a center for the further training of model pre-service graduates, and a school in which innovative, but sound new ideas in the education of children would be implemented. At the outset, each of several public school systems would agree to employ trainees as they finish the pre-service program, on a full-time basis, for a period of two years. As the total program develops, and more trainees complete the pre-service phase, cooperating counties would increase the number of portal schools, and more public school systems would be brought into the network.

The portal school as a link between the public schools and the university could provide great advantages to both.

School districts would have in the portal school a ready-made instrument for change, and the university would be assured that its graduates would be finding ready use for the skills developed at the pre-service level. But this can be done only by collaboration at the highest level. And collaboration implies that at every turn, the primary interests of each unit in the institutional network are protected, and that all parties have enough mutual interests which the program satisfies to hold them together.

Schools would also be involved in two other aspects of the model program. The first of these is a consequence of the instructional model described in Chapter II which is built around frequent teaching performances. These "teaching tasks" require access to elementary school children of different ages, ability levels and socio-economic backgrounds for brief, and extended periods of time. From the start, it was recognized that collaboration on this feature would constitute an index of the level of collaboration feasible with the schools.

As demonstrated by the prototype implementation described in Chapter III, tasks of short duration are best performed in an on-campus training center. New patterns of university-school collaboration must evolve if children are to be available in this way.

Tasks of long duration will probably have to be performed in public school settings. Traditionally, the specification of tasks for trainees has been difficult because of the impracticality of articulating trainee tasks with on-going classroom instruction. This problem will be amplified by the proposed instructional model. Only true collaboration between university and public school personnel can offset this difficulty.

The final aspect of the model which would require the schools to be a part of the institutional network is the awareness-involvement program. This would be a part of the underclass phase primarily under the responsibility of either the university lower division or the junior college. Public schools would be called upon to collaborate with either junior colleges or the university in developing and implementing a program which would involve students in activities designed to make them aware of the potentialities of teaching as a career.

State Education Agency in the Institutional Network

The most obvious point at which the model involves the state education agency relates to certification. The model makes no provision for professional education courses, as such, at the pre-service level. To implement the model, the state would need to agree to accept for certification institutional verification of performance competencies as the equivalent of their usual certification requirement. Collaboration involving the university, the state agency, the schools, and to some degree other state universities is essential throughout all stages of program design, development and implementation.

The model would also exercise another influence, less obvious, but perhaps just as important, on the state education agency. This influence would bear on the method of change used by the state department of education to bring about improvement in the public schools. The model proposes to use portal schools not only as the connecting link in a training program, but as an instrument for in-service training. If the model should be implemented in several districts, and if each district should develop several portal schools, ready made centers would be available for use by the state education agency for stimulating curricular change and instructional improvement. This potential will be realized only by full collaboration on the part of the state education agency and public school systems.

Industry in the Institutional Network

Industry in the usual sense is not an institution, but it is an essential part of the network necessary to implement the model. Basic to the teaching model is the concept of multi-media instructional resources for teacher training. The instructional model described in Chapter III is built in part on the theory that trainees differ in their abilities to learn through various media. Tape recordings (sound), video tape (action), transparencies (graphics), and reprints (written) are examples of the media used in options which must be available to trainees for use primarily in independent study activities.

While on the one hand, existing commercially prepared materials are proving to be of limited usefulness to performance oriented training programs, on the other hand the time and scarcity of production oriented skills seriously limit the capability of a university for producing its own materials, consequently, new patterns of industry-education collaboration must emerge if this aspect of the training network is to facilitate program design.

Limitations of Study

Limitations of time and resources made it impossible to study the feasibility of collaboration at every point in the institutional network. Some selection of ideas and institutional units to study had to be done.

On the basis just described, two school-college centers, the State Department of Education, and industries involved in the production of teacher training materials were selected. One of the two centers was in the Tallahassee area, and the other in the Miami area, which is about five hundred miles from F.S.U. The Tallahassee center included the Leon County School System and the Tallahassee Junior College. The Miami center included the Dade County School System, Miami-Dade Junior College, North Campus, Miami-Dade Junior College, South Campus, Broward Junior College, and Hillsborough Junior College. The Tallahassee area was selected for special study partly because of its proximity to the university, and partly because both the schools and junior college are representative of small to middle size units typical in Florida. The Miami Center is typical of metropolitan areas not only in Florida but in other parts of the country. Schools, junior colleges, the State Department of Education, and industry were selected because of their necessary participation in the awareness-involvement aspects of the program, in the portal school operation, in problems of certification, and in the development and production of training materials. It bears repeating that a program such as the F.S.U. Model looks to one set of institutional units for the beginnings of the program for many of its trainees, to another set for the culmination of its program, and to still another for licensure and welfare. In neither of these three institutional units is teacher training the central objective. The machinery of each, therefore, is organized primarily for purposes other than the ones which the F.S.U. Model would ask it to serve. It follows, then, that these institutional units would have to generate considerable programmatic adaptation in order to assume a stance which would respond to the network concept.

The feasibility study undertook to ascertain the parameters of collaboration among these institutional units. It was directed particularly at discovery of the major roadblocks to such joint actions.

Steps in Studying Feasibility

Advisory Body

The first step in testing the feasibility of an institutional network was to establish an advisory body of representatives of the kind of institutions needed to implement a program based on the F.S.U. Model. Specifically, the advisory body membership was made up of four F.S.U. faculty members, four representatives of the State Department of Education including the Board of Regents, and a single representative from Leon County public schools.

Meetings of Advisory Body. Two meetings of this group were held: one on June 17, 1969, and the other on July 8, 1969. The first meeting was spent largely in struggling with the network concept and the barriers in Florida to making the idea of an institutional network operative in a teacher training program. The group at this first meeting found it difficult to deal objectively with the institutional network concept because two of the institutional units which would inevitably be involved in any network attempt had experienced difficulty in previous collaborative efforts. The universities and junior colleges had failed in past efforts to collaborate on the development of policies for transfer of graduates from junior colleges to universities, and on the question of whether or not professional education courses should be offered at the junior college level. The misunderstandings and frustrations related to this set of problems was fresh in the minds of members of the advisory body. The ideas bearing on the institutional network concept that finally emerged out of this first meeting grew mostly out of the discussion of problems between universities and junior colleges. The advisory group did support the concept of a model teacher preparation program, but saw the resolutions of tensions to be of first priority.

The second meeting of the advisory body began with an attempt to move the discussion in a positive manner toward the feasibility of collaboration. A written statement elaborating on the institutional network concept and the kinds of problems which might be solved through this procedure was placed in the hands of members before the meeting. During the first meeting, members of the advisory body appeared to be thinking primarily about how the model program might affect each of them and the institutional units which each represented. Early in the second meeting, the focus shifted to a consideration of institutional network feasibility. Obviously, one of the major tests would be the extent to which the various institutional units could be brought to identify with the model. This group concluded that appropriate public schools and junior colleges throughout the state would be willing to cooperate in being implementors of a model component. However, true collaboration was seen as desirable but difficult to obtain.

The advisory group identified several constraints to collaborative implementation of the institutional network concept:

1. Fear on the part of teachers in public schools that innovations associated with portal schools would upset their security. Experienced teachers who are now regarded as good teachers would fear they might not be so regarded upon the advent of portal schools.
2. Fear on the part of school officials and school boards that university officials would tend to determine policy and deny local autonomy.
3. Concern on the part of junior colleges about the problems of staffing created by offering studies not in a course format and thus difficult to handle in a course framework. Related to this, was concern for the formula of generation of FTE faculty positions for funding purposes.
4. Reluctance on the part of junior colleges to participate unless they were certain that in so doing they would not jeopardize their working relationships with other state universities. This centered around concern for an apparent model specification of program specific work in the underclass years.

It is noteworthy that those people making up the advisory body were considerably more pessimistic in their outlook about possibilities for institutional collaboration than were those who are more directly responsible for the operating institutional unit. As pointed out earlier, most of these people function at the state level. While some of the constraints identified by this advisory body are very real (see Chapter VII), some of their concerns appear to be unfounded in the light of reaction by leadership personnel in the several public schools and junior colleges studied.

Meeting with Leon County School Personnel. A meeting with personnel from Leon County Public Schools was held for two major purposes: (1) To identify constraints to the development and utilization of public elementary schools as "portal schools"; and (2) To discuss the problems involved in utilizing practicing classroom teachers as members of teacher training curriculum development teams and as members of teams with responsibility for evaluating trainee performance.

Persons from the schools attending the meeting included the associate superintendent in charge of instruction, the coordinator of elementary schools, the principal of a new elementary school just ready to open, and a recognized leader among teachers who was being assigned to that school. The university was represented by faculty from the Model Project staff, the Chairman of the Department of Elementary Education, and the university Director of Student Teaching.

As in all other meetings held to study the issue of inter-institutional collaboration, a trained observer using participant-observer techniques developed by Smith[6] carefully recorded proceedings and inferences throughout the meeting. This observer's records and reactions were then combined with reactions of other staff members, and became the basis for conclusions and reactions reported herein.

It was evident from this meeting that perception of the intended role of the portal school in the entire model was not clear. This fact served to highlight the danger of dealing with any segment of the total model program in isolation. Even though Leon County personnel were involved in conceptualizing the total model, the "portal school" concept has not necessarily been understood except by those persons originally on design teams. The meeting brought to the surface two problems which had not received great attention during the phase of conceptualizing the portal school. One of these bears on the danger of overloading the school. Unless the training program for trainees can be intimately related to the program of curriculum and instruction for children, the dual role of the school may become non-functional. A major job of the staff associate in each portal school would have to be to see to it that most training activities evolve as integral parts of the on-going program for pupils. This should be possible since trainees are to be employed by the school district and will be functioning as regular teachers with responsibility to pupils for instruction.

The other problem to be recognized bears on the role of the principal. The influence of the university will be active in shaping the nature of the portal school. The staff associate in each school will in all likelihood be the person through whom the university staff works most closely. Even though this person will be jointly employed by the school district and the university, it is very possible that the leadership role of the principal could be jeopardized by this procedure. Steps to insure that the principal remains the policy representative of the school district would be essential to successful implementation of the portal school concept.

Some concern was voiced about the teaching load to be assumed by first and second year interns in the portal schools. Model specifications called for these trainees to carry less than a full load during their first two years of teaching in portal schools. To give them the time needed to plan for their faculty responsibilities and to further develop their professional insights and skills, the persons at this meeting felt that portal schools would have to utilize sound differentiated staffing patterns. If differentiated teams included para-professionals as well as master teachers and interns, it should be possible to carry on both training for teachers and good instruction for pupils.

Chapter III of this report is a description of both the development and implementation of a prototype of the instructional model implied by Phase I specifications. As work progressed on that prototype, it became apparent that teachers and supervisory personnel from regular public school district staffs both could and sould play important roles in this process. Their immediate proximity to on-going instruction, and the particular expertise which this would contribute, makes it highly desirable that these classroom-oriented persons work actively on teams developing the curriculum and materials of teacher training instruction, and also be active in evaluating the "teaching task" performance of trainees as they progress through the program. The immediate problem here seems to be one of time and funding. If development activities could proceed during summer months, it would be entirely possible to utilize significant populations of elementary teachers in this activity. However, utilization of teachers during the school year poses serious problems for public school administrations. If classroom teachers are to be regularly or temporarily used as members of the teacher training staff, procedures would have to be developed for including within public school district operating budgets the funds for extra personnel needed to release teachers on a part or full-time basis from their normal duties with children. Although yet an unsolved problem, it is likely that cross institutional funding patterns would have to be developed since this is a cost attributable to teacher education and not to public school instruction.

Although not relevant to the immediate question of feasibility, an agreement was reached at the conclusion of this meeting to begin, in the spring of 1970, the pilot operation of one school in Leon County as a "portal school." Certain modifications of Phase I specifications for trainee population will be necessary since the total model program will not yet be in operation by that time. However, in other respects, it should be possible to implement the portal school concept on this pilot basis.

Meetings with Junior College Representatives. The model was discussed at least three times with representatives of junior colleges. Each time an effort was made to face up to the question of whether they were prepared programmatically, logistically, and attitudinally to collaborate. It was recognized from the beginning that it would be more difficult to meld the junior colleges into an institutional network than establish collaboration between the university and the public schools. As already pointed out, junior college personnel were unhappy about transfer policies of the university and about attitudes of universities toward the practice of offering professional education courses at junior college level.

Clearly, if junior colleges were to cooperate at any level, they would have to see in the model the potential for meeting their own needs. Collaboration at the level of becoming a unit in a network where two or more institutions work on even terms for a common cause would have to be postponed until later.

In this setting, academic vice-presidents and faculty representatives from five junior colleges met with faculty and staff members from Florida State University. Earlier meetings with these people in their local settings had led to assurances of their interest in seeking a solution to the problems of closer collaboration, and in the model as a possible solution.

Four major areas of concern which bear on the feasibility of implementing this aspect of the F.S.U. model were considered at this meeting; (1) A cluster of concerns relating to transfer from a junior college to the senior institution including criteria for admission to the model program, diagnostic assessment of entry skills, and placement in the model program. (2) The role of junior colleges in professional education. (3) Responsibilities of junior colleges for general education. (4) Possible relationship of programs for training paraprofessionals in junior colleges to awareness--involvement portions of the model program which might be offered there also.

The meeting began with an expression of attitudes indicating clearly that junior colleges did not regard themselves as a unit in an institutional network for teacher training. In effect, they said they would cooperate with them in a more liberal admission policy for their student transfers and a more flexible policy in accepting credits in professional education offered by junior colleges.

It is worthy of note here that the liberalization of general university admission policies no longer constitutes a major block to collaboration. In fact liberalization procedures were ready for public announcement at the time of the junior college meeting, although not yet released.

The problem of credit given for professional courses taken at the junior college level is difficult but surmountable. It should be remembered that the F.S.U. Phase I Model specifies that performance criteria will determine program progress. Professional education courses previously taken will relate to this feature only in that trainees entering with junior college credit may or may not be more able to perform successfully at higher levels of the program than will those without such credits.

Once concerns were aired and clarified, consensus was reached on constraints to model implementation and the requisites for overcoming them. First, the faculty of the university and the faculties of junior colleges would have to collaborate in further clarifying the objectives to be achieved through awareness--involvement programs, and plan together the kinds of experiences which perspective trainees would have. This suggests that even though certain specifications for the underclass phase already exists from Phase I, all further development and probably some modification will be necessary on a collaborative basis.

Second, the two institutional units would have to agree upon criteria for judging whether trainees had completed a general education program adequate for transfer to the model program. This would include evidence that they had acquired concepts in the behavioral sciences and understandings in certain entry skills as measured by a battery of examinations. Here, the junior college persons felt strongly that their involvement in further development of entry skills assessment batteries and possibly in the implementation of them was necessary.

Third, at the outset, university and junior college officials would have to agree upon a basis for model program selection procedures which, by specification, are to be imbedded in the preprofessional aspects of the underclass programs. Also, since the preprofessional program for entry into an operational program based on the F.S.U. model may or may not be acceptable as a prerequisite experience for entry into other senior institutions, further development of this aspect of the model program will have to involve design participation of these other receiving senior institutions.

The discussion left at least one important problem unresolved. This problem bears on the relationship of programs for training para-professionals in junior colleges to programs designed for persons who may reasonably be expected to prepare for professional service. It would simplify matters if a clear line could be drawn between para-professionals and potential professionals at the junior college level, but this seems unrealistic for several reasons. First of all, while the relative emphasis on academic and skills preparation for para-professionals and professionals might differ materially, there would still be a considerable amount of overlapping. Second, although a major objective of para-professional programs is the development of job specific skills, certain experiences leading to the attainment of that objective might well overlap with an awareness-involvement experience as part of the model pre-professional program. Third, in the main, these two programs might appeal to distinctly different populations, but experience in certain current junior college programs suggests that there are enough exceptions to make it necessary to keep the career ladder concept fully operating.

Industry in the Institutional Network

Although many contacts were made with representatives of various segments of education related industry, an industry-education conference planned for early December had to be postponed until January, and consequently is not reportable at present. It is interesting to note that a primary reason for postponement was what appears to be a level of instability or possibly job mobility among industry executives responsible for fledgling training materials divisions of large corporations.

A selected group of key personnel representing software (publishing and multi-media) and hardware (audio-visual equipment and computers) industries were invited to the conference. Of seven invited, three had moved to new jobs between the time originally identified in the late spring of 1969 and November of 1969 when the conference was announced. Response from those reached was very positive and all gave at least initial indication of wishing to seek solutions to the same set of problems which the F.S.U. model projects staff has identified on the basis of the prototype development activity.

Because it may serve to further substantiate the existence of problems identified by other feasibility study projects, mention is made here of those concerns most pressing in the area of industry--education collaboration as perceived by the F.S.U. model project staff.

After a summer's involvement in development of an operable prototype of the FSU model program, a number of realities must be faced. First, teacher education faculty members as represented by those already in professorial positions by in large do not now have the time or that set of skills necessary to efficiently design and produce multi media instructional materials to behavioral specification.[3] Second, the extent of development activities (design, testing, and production of instructional materials) called for in a full scale implementation of the FSU model is massive. Chapter III describes a prototype implementation including ten "task units." If this "task unit" is accepted as a basic unit for development purposes, a conservative estimate of the "task units" required for full program implementation would likely exceed 300. When followed out to the level of instructional options (see Chapter II), this could require development of 9,000 or more packages of enabler specific materials. This is an imposing task in number alone, to say nothing of the necessity that any institution undertaking such a task must also maintain an existing training program until it is replaced by the model program.

Faculty members can learn skills needed given motivation, time, and training, but given the time demand for materials design and production, it is questionable whether this is efficient use of faculty who are needed in several new roles (see Chapters III and VII). As a training procedure, involvement in the development process is effective. But, it is doubtful that large numbers of faculty can be freed over the necessary five year time period to develop the massive quantity of multi media instructional materials suited to individual trainee use as required by FSU model specifications. Some means will have to be found to bring industry and education together to accomplish this task.

An alternative may well be to spread the development tasks over several institutions whether or not industry accepts the challange to be a part of an institutional netowrk. This idea is discussed further in Chapter VII under the section on constraints to implementation. However, it is hoped that the industry-education conterence referred to earlier will yield substantive suggestions of solutions to this particular set of problems.

Conclusions

If the goal is total implementation of all programatic aspects of the F.S.U. Model, then failure to establish an operating institutional network will seriously jeopardize the chances of successful implementation. Given the conditions required by Phase I specifications and discussed in detail thus far in this report, the F.S.U. Model is simply not feasible of implementation unless public junior colleges, public school, state departments of education, and industry join with a university in developing and operating such a training program. The training program specified is too complex, demands too wide a variety of training personnel and training environments, and requires too great an array of instructional resources to remain a single-institution mission. It would appear prudent to attain firm assurances of such an institutional network capability prior to any decision to implement the F.S.U. Model.

CHAPTER VI

FEASIBILITY STUDY OF FACULTY DEVELOPMENT

The idea that the solution to some problems constitutes the source of others is illustrated clearly by the elementary model reports. These program models help to solve such problems as theory-practice contiguity, pre-service--in-service continuity, and individualized instruction for trainees. But in remedying these weaknesses in traditional programs they create problems which were not troublesome before. A great many of the new problems relate, in one way or another, to faculty development.

To develop and further implement specifications set out in all of the program models calls for redefined roles for personnel now involved centrally in teacher education programs. Also many persons who have been only marginally connected with teacher training, if at all, are called upon to fill roles in these newer conceptualizations. All old hands, as well as new, would be engaged in activities new to them.

The sheer numbers of faculty persons required to prepare teachers has been increased, largely by three ideas in the models. First, implementation of instructional specifications in the program models requires a multi-media approach. This specification would involve them with multi-media specialists and vice versa in a new relationship focused on concepts and skills to be developed, media which are expected to develop them, and trainee characteristics to which both must accommodate. Establishing this new set of working relationships constitutes a faculty development task of considerable size. Second, all of the program models require and expect a more complete interdisciplinary approach to teacher training. Their implementation would require specialists in the disciplines to work hand and hand with specialists in learning and teaching theory, with curriculum designers, with media and materials developers and producers, and with computer specialists. Adding these groups of people to those now commonly involved in teacher training greatly increases the number of persons with whom teabher educators must learn to work and who together must learn to do new things in new ways. Third, the comprehensive unitary nature of these program models further extends the boundaries of faculties to include the lower division on campus, junior colleges and public schools. The systems approach used in designing these program models resulted in specifications which, for their realization, involve lower division and/or junior college faculties and public school teachers and administrators. By reaching back into underclass and/or junior college administrative units for systematic recruiting, selection and counseling efforts, and by extending training efforts forward into the in-service period, the program models bring even more persons into teacher education, including many faculty members not usually involved in teacher training programs.

Obviously, then, the models create faculty development problems for institutions that would like to move in the direction of their specifications. Faculty members would need concepts and skills, intellectual and inter-personal, which many do not now have. These require as much a change in attitude as a change in competency. Thus, the two major dimensions of a faculty development effort would seem to be a substantive one and an attitudinal one. Within each, attention must be focused on : (1) What barriers actually exist? and (2) What means can be effectively employed to overcome these barriers?

Barriers to Faculty Development

There are recognized barriers to faculty development. One cluster of barriers may be described as human or personal. Insecurity, fear, personal ambition, lack of confidence and lack of integrity--all of these and others serve as personal barriers to faculty development. These are abstract words, but the further development and implementation of the Model would produce situations which would give reality to each of them.

There are also programmatic and logistical barriers. All kinds of academic institutions are divided into units, schools, divisions, departments. These units tend to make people myopic instead of global in their outlook and activity. Mind sets and habits become deeply embedded. The models call for inter-disciplinary activity. The trend toward faculty specialization and the emphasis on academic freedom have encouraged faculty members to go their own ways. Each has tended to stake out his own subject specialty and adopt his own teaching style. For these reasons changes which would require new knowledges and would require the sacrifice of some independence would have to offer strong off-setting incentives. In order for the models to work it would be necessary for the forces of change inherent in them to be great enough to overcome the inertia supported by other forces. This organized form of specialization and isolation constitutes a strong barrier to faculty development.

There are also financial barriers. Unless some things which would contribute to faculty development could be done well, it might be better not to undertake them at all. Planning and implementation of instructional experiences as well as the development of instructional materials to support them are good examples of the kinds of faculty development which would require extra expense.

Original Plans for Study

The preceding paragraphs have described in broad terms the dimensions of the faculty development problems created by the program models. While this project staff was sensitive to these problems in general, the feasibility study gave particular attention to them in relation to the FSU program model.

When the model specifications were written, and later when the feasibility proposal was developed, extensive plans were made for testing a wide range of activities relating to faculty development in connection with the FSU Model. Plans were made to conduct gatekeeper seminars, to hold clinics on the use of various teaching media, and to organize conceptual seminars that would deal with the demands which the program model would make on the faculty. It was also planned to test an involvement-oriented hypothesis in this problem area by using participation in planning and implementing a prototype experience with the model as a way to faculty development. It was recognized early that Phase II monies, should they be forthcoming, would not in all probability be extensive enough to allow an adequate test of all of these. Thus, a faculty development oriented project was spelled out in detail in a proposal submitted to the TTT program of EPDA.

It was made clear in this proposal that the activities for which funding was sought were to be related to the faculty development tasks evident in the FSU Elementary Model Report (Phase I), which had been prepared as a funded project of the Bureau of Research. However, minimal funding to be used for planning purposes only, was secured through the TTT program. Thus, for all practical purposes, the TTT funded activity could not function as an integral part of the Phase II feasibility study as originally planned. This development caused a change in plans for the study of feasibility in relation to faculty development needs.

A reassessment was required of what could be done in Phase II, with limited time and funds, for testing the faculty development question. The project staff was interested in three key questions:

1. How feasible is it to contemplate modifying the attitudes and behavior of faculty memebers to the point required by the model?
2. What are the major barriers to faculty development?
3. What means of faculty development are effective?

The most appealing hypothesis to test was the one of involvement. It could be stated thusly: if the faculty members are participants in the developmental work required to implement for a period of time a prototype of the specified training program, and are further involved in the implementation and evaluation of that prototype experience, then they will understand more completely and be more accepting of the changed role for faculty memebers specified in the model. Most of the Phase II feasibility effort related to faculty development became a test of this hypothesis.

Two other kinds of activities tangentially related to faculty development were carried out, but not to the extent of the faculty involvement trial. Time was devoted in special meetings of the Department of Elementary Education for progress reports to the faculty on both Phase I and II of the model project. These were utilized as stimulants to discussion, all to the end of expanding understanding and developing readiness for systematic consideration of the model as an approach to teacher education. The Head of the Department of Elementary Education and the Director of the Phase II feasibility study accepted a number of invitations to speak to groups of faculty and/or doctoral students about the model and each such meeting included time for rather vigorous give and take about it. While these meetings helped those involved to know more about the model, they were not faculty development activities as originally defined. However, through these activities it was possible to identify those persons most ready to undergo a training experience. This readiness was followed up in some instances by voluntary involvement in prototype development and implementation efforts. Further follow-up is planned for the time period immediately following completion of the feasibility study.

Similarly, a limited number of junior college faculty and public school personnel were participants in such information-oriented discussions, with much the same result. The model ideas were viewed by them as being attractive and exciting. There was expressed willingness to participate in a test of them, opening again involvement as an approach to faculty development.

The Prototype Experience as a Faculty Development Activity

A more complete description of this prototype experience is useful at this point. In order to test the feasibility of the instructional model projected in Phase I specifications, the decision had been made to conduct an instructional prototype for a period of three weeks with a limited number of trainees. To this was now attached a test of the prototype experience as a faculty development activity. Preparation for this prototype involved a large number of faculty members in a wide array of activities. Those who wrote the Phase I model specifications had left much to be done before any part of the instructional program could be tested on trainees. The further development of these specifications, it was reasoned, would constitute learning experiences for faculty members involved in it. As examples, a teaching model had to be designed; teaching tasks had to be formulated and stated; enablers and options for their development had to be identified; materials of instruction drawing on various media had to be either produced or selected; arrangements had to be made for practice pupils; equipment such as video tapes, viewing machines and tape recorders had to be assembled; devices for evaluating trainee performance had to be developed; and faculty and staff had to be assigned roles consistent with the many tasks involved in implementing the prototype training model for twenty trainees for three weeks.

Senior and junior faculty members, graduate students and undergraduate students, and a few public school teachers from the local school district were involved in all of the tasks mentioned above. Early in the feasibility study, the focus in the prototype experience was on the development of the teaching tasks and related activities for trainees. As the study proceeded, small groups were set up to deal with specific aspects of plans for the prototype.

Until about five weeks before the prototype was to begin, work in preparation for it was undertaken by individuals and groups working quite independently of one another. At that time the total involved faculty and staff met for a "dry run" to pert out the three-week prototype. For the first time, the faculty and staff as a whole seemed to conclude that the curriculum and instructional specifications in the model were feasible of realization. As a result, the faculty effort during the remaining five weeks before the implementation of the prototype was put forth with observable added enthusiasm. Just how much earlier motivation would have been improved by helping each faculty member to perceive the total operation is difficult to estimate. Certainly, it seems possible that it would be worth the effort to develop this "global view" as early as possible, consistent with getting necessary individual and groups tasks accomplished.

The fact that the prototype training model was reasonably successful as an experience for trainees is *prima face* evidence of the possible effectiveness of this means of faculty development. Faculty members, graduate assistants, undergraduate students and teachers from the local public schools were able to plan and provide a successful prototype experience for a small number of trainees for a short period of time. Before the planning for this prototype experience began, these faculty members and others did not possess the ability to organize the knowledges and skills necessary for a successful prototype experience for trainees, nor were they necessarily positive beyond a limited point in their attitudes about it. Obviously, the faculty and their colleagues learned as they went.

The process through which they developed the prototype is an informative object of study. All activities bearing on the prototype were planned and carried out jointly by students and faculty members. Some under-graduate students and teachers from the local public schools helped to design teaching tasks, identify enablers for each task, generate the options for learning these enablers, and determine evaluation criteria. Involving persons with a wide range of experiences was done for the purpose of keeping teaching tasks as close as possible to reality. Designing tasks, identifying enablers, and generating options required the graduate assistants and faculty to deal with teaching behaviors and multi-media. Determining criteria for evaluating the teaching done by trainees required faculty members to deal with behavior approximations. In general, two kinds of learning took place through this mixture of activities. All those involved, from senior faculty members to teachers from the local public schools, gained new concepts, developed new skills and modified attitudes relating to teacher training. They also learned some things about the contributions which faculty members from different disciplines with different specializations and at different levels in the faculty hiearchy can contribute to an endeavor requiring many different skills. They learned that the "peck" order was much less important in the solution of a problem than the competence which an individual could bring to bear on a particular problem at hand. If the F.S.U. experience in preparing for the prototype can be accepted as a safe basis for extrapolation the future augers well for finding ways whereby viable teacher training programs can be designed and implemented jointly by college faculty members and public school personnel.

Prototype Operation as a Trial for Faculty Roles

For the three-week period in October of 1969, faculty, graduate assistants and para-professional staff members functioned as a team to implement the prototype curriculum. They instructed trainees in the use of such equipment as video tapes, tape recorders, filmstrip viewers and computer terminals. They arranged task-teaching sessions for trainees and evaluated their performances via the use of remote TV monitors. They held small group seminars with trainees to obtain and provide feedback on different

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aspects of the training operation. They held meetings, with all trainees and staff present, for the purpose of assessing the success of the full operation. Every activity in which staff functioned during the three-week period had an element of newness about it. Faculty members were performing in roles very different from those to which they were accustomed.

Interpretation of Faculty Development Through Planning and Implementing the Prototype

These two types of activities - planning and implementing - provided two opportunities for the faculty to gain many of the new concepts and skills that would be needed for full scale development and implementation of the model.

In the planning phase and during the prototype implementation, graduate assistants and faculty members functioned in somewhat different ways. For example, in the planning phase, the curriculum was designed by faculty members and graduate assistants generated most of the instructional options. Graduate assistants also constructed, with faculty guidance, the tests used to evaluate the enablers. During the prototype, most of the counseling of trainees was done by faculty members, while trainee performance evaluation was carried on by a team composed of faculty members, graduate assistants and elementary school teachers. This division of labor could conceivable be seen to simulate the larger model operation from the viewpoint of staff differentiation. Obviously, it worked reasonably well on the prototype and would seem to be useful in implementing the full program model. There are roles for professors, instructors and a wide range of para-professional personnel.

Planning and implementing the prototype had more than temporaryly observable effects on faculty members. The best evidence of this is found in the behavior of some of them since the prototype experience. They have apparently become committed to the basic tenets of the model. Four faculty members, two of them deeply involved in the prototype and the other two involved, but less so, have expressed the desire to revise their current courses in the direction of the model pattern. A proposal has been submitted by one of them asking for a university instructional improvement grant to underwrite such an effort.

One further interpretation of the effects of the prototype experience on faculty development seems justified. The smaller the number of new adjustments required of individual faculty members at any one time, the less shock of moving toward the program model and into a differentiated staff operation. Faculty members generally showed little reluctance to assume one role or responsibility. They seemed to turn away from trying to fill more than one new role at a time. This experience suggests two things: first, that the team approach to the development and operation of the program model be used from the outset; and second, that faculty members be given further new duties only after they have become comfortable in performing any initially accepted new assignment. Faculty members tend to be overwhelmed when they see all of the things which the model requires that they be able to do. But when they get into the operation on a team basis, and find themselves responsible for one set of concepts and skills, while their colleagues are doing something else, the human resistance problem seems to be greatly lessened.

As reported earlier in this chapter, considerable thought was originally given to the possibility of providing seminars and workshops for the direct training of faculty members. These would have dealt with concepts utilized in the model or with skills required to develop and implement it. However these seminars were not used except in informal small group sessions. Instead, attempts were made to collect evidence of what was happening to concepts, attitudes and skills of faculty members as they went about the business of planning and implementing a prototype teacher training operation. Planning and implementing activities were not structured for the specific purpose of training the faculty in the process. The focus was on planning and implementing the program for trainees; never on training the faculty. However, it can be concluded on the basis of the limited prototype effort that this indirect approach to faculty trainins is effective and in many ways preferable to more direct approaches.

CHAPTER VII

FEASIBILITY PROJECTIONS

Chapters II through VI have presented the results of activities directed to the end of providing information on which to base decisions about the feasibility of implementing a training program based on the F.S.U. Phase I specifications. Throughout these chapters there has been an attempt to extend the basic conceptual design of Phase I to a point from which sample implementation was possible.

Key design features have been tried out in prototype form, using the Phase I specifications as a development springboard. An instructional model embodying design features of the Phase I Model was given life in the prototype. Materials were developed and produced for use by trainees. Faculty learned how to function in a new and different set of roles. Students became model trainees for a brief period of time. A computerized management system was developed and functioned. Junior college and public school leaders joined with university personnel to tackle seriously the issues involved in collaborative programs. Insofar as activities engaged in are concerned, the F.S.U. Model is not only feasible, but in at least a small way, major components have had a successful field test.

But lest a reader draw false conclusions about real outcomes with large populations of trainees, the whole matter of feasibility must be examined in a full scale operational context. This chapter will do three things:

1. Make basic projections to possible parameters of a full scale program involving sixteen hundred trainees in a performance based curriculum. These trainees will be pursuing completion of three hundred task assignments over a time span of six plus years of pre-service and in-service work.
2. Present alternatives to elements of the F.S.U. Model which appear not to be feasible.
3. Deal specifically with several constraints to full implementation.

Failure to adequately adapt the system to these constraints may well render impossible the successful development and implementation of the F.S.U. Model.

Parameters of An Operational Program

It is necessary to assign numerical values to certain program parameters in order for projections to full operation to be meaningful. The first of these is a quantitative dimension for the curriculum itself. It will be recalled from the Phase I report and from Chapter I of this report that the F.S.U. Model specifies work of either a pre-professional or professional nature from the first year of college through two full years beyond the bachelors degree. This work is categorized in three phases: (1) An underclass phase covering years one and two; (2) The pre-service phase covering approximately years three and four; and (3) The in-service phase covering three summers and two academic years beyond the bachelors degree.

Task Units

In order to extrapolate from trototype data to these vary different phases, an arbitrary use has been made of the "task unit" framework (see Chapter II). Tasks as developed for the prototype were best representative of early stages of the pre-service phase of the program. Use can be made of the same format for curriculum organization if tasks are modified to suit the limited awareness-involvement objectives of the underclass phase and the highly complex analytical study and high level skills development of the in-service years.

Pre-Service Tasks. As implemented for the prototype, the "task units" tended to include very brief task assignments and encompassed a very limited number of basic Model specified enabling objectives. For a full scale pre-service program phase, these tasks would have to be generally more comprehensive in scope and stretch across all professional content areas to stimulate trainee acquisition of those behaviors prerequisite to professional teaching in the elementary school. The best estimate that can now be made, based on behavioral specifications from Phase I and from experience gained in developing the prototype, is that it will take a minimum of two hundred task units to encompass the full pre-service phase. The management system as adapted to the instructional model of Chapter II can accommodate ten enabling objectives per task. Thus, for 200 tasks in the pre-service phase, it would provide a framework for 2000 enablers, which should allow for inclusion of all specified objectives plus necessary repetitions for growth or reinforcement purposes. This is approximately 2.5 tasks per week. This should be a reasonable average since early tasks would be brief as opposed to a few tasks requiring as much as a full week to perform toward completion of the pre-service phase. (Trainees averaged 2.2 weeks per week during prototype operations even though they were completely unfamiliar with the process as was the prototype staff which tended to cause some delay at times.) It should also be remembered that freedom of choice and advance readiness enable many trainees to pursue only that instruction they actually need.

Underclass Tasks. A very small number of tasks is projected for the underclass phase. Approximately twenty could very easily encompass that set of objectives suggested by an early awareness-involvement concept. Since specifications call for limited but regular pre-professional involvement at the underclass level, it should be possible to spread these tasks out across the two years of underclass study. Thus, the enrollment load can be minimal and yet a continuous pre-professional involvement can be attained. This raises certain severe feasibility problems with regard to funding and staffing such "task units" for junior college students. This problem is discussed in later paragraphs.

In-Service Tasks. The same type of logic is arbitrarily applied to extrapolate to the in-service phase of the Model. Summers spent on campus, planning, specializing, analyzing and developing advanced skills would be encompassed in approximately twenty "task units" per summer for a total of sixty. This relatively small number is possible because portions of this summer study will resemble traditional disciplinary study although application to the in-service teaching experience will be stressed. It is also necessary because summer session time availability is relatively brief compared to the academic year. The summer study plus ten task units spread over each of two initial teaching years would involve a total of eighty task units.

Again, the reader is cautioned as to the speculative nature of this projection of three hundred task units as a basic parameter of total program based on the F.S.U. Model. It is reasonable, however, in terms of extrapolation from the prototype to the anticipated time availability for a total program. It is also reasonable in terms of the extent of Phase I behavioral specifications.

Trainee Population

A second program parameter which needs quantifying for projection purposes is the anticipated trainee population.

The program projections which follow are based on a "headcount" of 1600 trainees spread over the approximately six years of the program. (Headcount refers to total program enrollment.) Figure 18 suggests anticipated distribution of this 1600 trainees over each of the six academic years and three summers which make up the program for the average trainee. An F.T.E. student is program "headcount" converted to full-time-equivalence based on the percentage of time spent in the professional program.

In Figure 18, the numerals represent the anticipated distribution of trainees over all phases of the program at any given time and as such, take into account attrition factors at the end of each program phase. The total is based on an estimate of the anticipated trainee population expected at F.S.U. in early years of the program's operation. Accommodation has been made to an anticipated decrease in enrollment and graduates, at least for a period of time, due to the increased time commitment required of an entering trainee. (F.S.U. now awards bachelors degrees to approximately 350 elementary teachers annually. The comparable figure as seen in Figure 18 is 250.) Also, F.T.E. student calculations are based on current practice at F.S.U. and on percentage involvement in the model program as specified in the Phase I Model.

Physical Facilities

A third parameter for which quantification is needed relates to where trainees will study for and perform tasks. Chapter III gives a detailed description of the resource and training centers used during the prototype. Centers such as these plus small seminar rooms would house both performance and study during actual operation, but would have to be supplemented by public school environments for certain tasks. Figure 19 gives a quick reference to the number of tasks by year in the program and by facility needed.

The projection of facilities utilization by tasks is used with conclusions based on prototype data about trainee time spent in such facilities to make estimates of the size and type of facilities needed to implement the F.S.U. Model. Equipment projections and to a certain extent staffing needs are arrived at using the same extrapolations.

Training Center. By referring to Figures 18 and 19, it can be seen that 500 pre-service level trainees would

Trainees Enrolled

		Year	"Headcount"	F.T.E. Students
Program Phases	Under-class	1	350	70
		II	350	70
	Pre-Service	III	250	168
		IV	250	168
	In-Service	(Summer) 1	(600)	(400)
		V	200	200
		(Summer) 2	(600)	(400)
		VI	200	200
		(Summer) 3	(600)	(400)

Projected Distribution of Trainees
over Program Years

Figure 18

	Tasks Requiring Use of Specific Facilities			
	Resource Center	Training Center	Seminar Rooms	Public School
Underclass Tasks (total = 20 tasks)				
Preprofessional	20		20	10
Pre-Service Tasks (total = 200 tasks)				
On Campus	150	150	150	
Off Campus	50		150	50
In-Service Tasks (total = 80 tasks)				
Intern			20	20
Summer	60	30	60	
Total Tasks by Facility	280	180	300	80

Facilities Utilization by Tasks

Figure 19

need access over approximately two academic years to a training center to perform on approximately 150 tasks. At an average completion rate of 2.5 per week, with an average facility utilization of 30 minutes per task, and a daily availability of pupils as task subjects of five hours per day, the number of teaching stations needed is approximately 24. Six additional stations would be needed for playback purposes.

A transient population of approximately 100 elementary school pupils will be needed regularly to facilitate task performance portions of the program. These pupils can be bussed from local public schools quite satisfactorily by a single bus leased from the public school district for use during hours not affecting regular morning and afternoon service to schools. These pupils will need to be housed while at the training center in four normal sized classrooms, referred to in Chapter III as holding stations.

Thus, a training center to serve the sixteen hundred trainee population would consist of approximately twenty-four teaching stations, six playback or viewing stations, four holding classrooms, and suitable office, storage and waiting area. One feature of a training center as conceived here is that during hours they are not in use for their primary purpose, teaching stations could easily double as seminar stations in sufficient number to eliminate further program demand on general university facilities.

Although it would certainly be desirable to construct new facilities for training center purposes, alternatives do exist. The one utilized for the prototype operation involved use of a campus-related church educational facility. A large church plant often includes both the size and number of rooms described above. Suitable lease arrangements could be an alternative solution meriting careful consideration.

Resource Center. Similar reasoning generates the parameters for a resource center to serve as the basic instructional center for the F.S.U. Model Program. Experience from the prototype suggests that the 500 pre-service phase trainees will need to spend up to four hours daily independently pursuing instruction in a resource center. Up to 700 students involved in the underclass phase may spend up to an average of two and a half hours per week in the center. This maximum demand on the facility would generate 2350 trainee hours daily. If the center were available fourteen hours per day, the center would have to be capable of sustaining a 168 trainee density at 100% utility throughout the time it was open. A more reasonable utilization factor of 80% suggests a resource center with a maximum density capability of 210 trainees. Using a rough estimate of 50 square feet per trainee to calculate a resource center capable of handling the activities described in Chapter III, approximately 10,500 square feet of space would need to be allocated for this purpose.

Feasibility with regard to all facilities needed to carry on the performance and independent study activity required by such a program is entirely dependent upon the ability and willingness of an institution to dedicate this amount of space to the utilization of a single program. Teacher education programs have traditionally placed relatively low demandsson the physical facilities of universities. These demands have generally been for the most ordinary types of classroom space. Seldom have these demands closed space for use by other programs. Acceptance of this type of facility usage would appear to be a necessary institutional adjustment for such a program to be maximally successful.

Staffing Needs.

A fourth parameter for which projected quantification is important is that of staffing patterns. Because it was experimental in nature, and because it was also serving development purposes, the prototype described in Chapter III functioned with a ratio of close to one staff member to each trainee. This is hardly a cost effective method of staffing a training program. However, the experience gained in operating the prototype is useful in establishing basic staffing ratios. It also provided evidence that differentiated teams consisting of professional faculty and para-professionals could function effectively in the roles specified for the F.S.U. Model Program.

Counseling Team. A basic role is that of counselor-reflective seminar leader. For the pre-service phase of the program, an interaction ratio of one staff member to ten trainees (as achieved in the prototype) could be achieved operationally by a team of one professor, one graduate assistant, and two student assistants (advanced undergraduates or honors students in final stages of the pre-service phase of their program), working with groups of forty trainees each. Thus, assuming approximately 500 trainees in the pre-service phase, it would take twelve or thirteen teams to furnish necessary counseling and reflective seminar leadership. With twelve or thirteen faculty members devoting two-thirds time to this role, these teams could provide necessary staff-trainee interaction. A comparable number could serve in like capacity during the summers in addition to the approximately 30 faculty associates who normally serve the "portal school" population. This larger number of on-campus faculty would be needed to accommodate the in-service trainees returning for summer work. A very small number of faculty could carry the counselor role in the limited underclass pre-professional work.

Training Center Team. The training center needs professorial direction but can generally be staffed by a team of para-professionals. The center manager, technicians, holding station teachers and most evaluators can usefully be classified as para-professionals or non-professorial. These persons can be graduate assistants and highly qualified and experienced classroom teachers who can here find temporary or even permanent roles in teacher education. It would take a team of approximately twenty-eight evaluators to assess task performances. Four teams of six experienced teachers and one professorial faculty member each could adequately handle this function and maintain the essential total faculty/staff interrelationship so necessary to a successful program.

Resource Center Team. The resource center staff can also be comprised largely of para-professionals under the guidance of a professorial team. The scheduler, librarians, technicians and general resource help can be graduate assistants or permanent non-professorial persons trained to perform specific roles as described in Chapter III. This center where a major portion of instructional pursuit occurs would actually be the most cost-effective portion of the program from a staffing standpoint. Extrapolation from the prototype operation suggests that a team of twenty para-professionals and two professorial faculty can operate this center throughout its long, fourteen hour day on a shift basis.

Instructional Seminar Faculty. Instructional seminar staffing is difficult to project since the prototype failed to yield sufficient trainee demand on this aspect of the program. A purely arbitrary projection of one hour per week at the underclass level and two hours per week during pre-service and in-service phases yields 2500 trainee instructional seminar hours per week. If a faculty to trainee ratio of one to fifteen is used and ten instructional hours is considered a full teaching load, approximately seventeen full-time faculty would be needed to service this feature of the program.

Curriculum/Materials Development Team. Another role which must be filled to keep such a program operating is that of curriculum/materials development. Even after reaching operational stages, the regenerative features of the F.S.U. Model will demand revision and new materials development on a regular basis. A small allotment of professorial faculty and non-professorial faculty to this role throughout the academic year will be needed. During the summers, however, the development team can be considerably enlarged by the addition of faculty released from undergraduate instructional roles and by classroom teachers from "portal school" districts. Both of these "summer" developers have much to contribute to the task of generating the basic instructional resources which are the backbone of this program.

Management Team. Staffing of the management functions so necessary to the operation of this program will require in addition to a normal complement of administrative and support persons, a well-qualified fiscal analyst and a group of computer support persons. Projected computer staffing needs have already been discussed in Chapter IV.

Staffing Comparisons

In summary, ideal staffing for the F.S.U. Model Program to accommodate 1600 trainees distributed as seen in Figure 18, would include approximately forty, full-time-equivalent professorial faculty, thirty faculty associates (jointly employed by the university and the "portal school" districts), approximately one hundred para-professionals functioning generally in half-time positions such as graduate assistants and student assistants (from fifteen to twenty of this number might be full-time, permanent persons), and approximately thirty support persons such as secretarial and computer personnel.

Again, if the information from Figure 18 is used for calculation, current formulae in use at F.S.U. would yield thirty-five full-time-equivalent professorial faculty on the basis of the underclass and pre-service phases alone. When the in-service phase is considered, by current formulae the program would generate more than ninety full-time-equivalent professorial faculty. Even with a reduced formula basis for equating the in-service "portal school" enrollment, the ratio of faculty positions needed to serve the Model Program would still be less than would be required for comparable enrollment on present formulae.

This is offset by the need for para-professional and technical personnel not now used in teacher training programs. It does not seem unreasonable, however, to conclude that as far as staffing is concerned, it is fiscally, programmatically and logistically feasible to implement the F.S.U. Model with the type of staff differentiation projected above.

Operational Cost Projections

If the preceeding paragraphs have defined quantitatively the parameters of an operational program based on the F.S.U. Model, it should be possible for an institutional fiscal analyst to project operational costs for a given institutional setting. For purposes of rough comparison, it is the estimate of this project's fiscal analyst that salaries alone would total from 1.0 to 1.5 million dollars annually. This extremely wide range is due to the probability of institutions using greater or lessor numbers of junior, as compared to senior, faculty members and more or less graduate and student assistants as compared to permanent para-professional personnel. As far as other operating costs are concerned, although computer costs and equipment budgets would exceed those of current programs, the most reasonable generalization that can be made on the basis of this study is that the extent to which operating costs per student trained would exceed comparable current costs would be most directly related to higher salary costs if any differential exists.

Development Projections

From a development standpoint, data gathered during the prototype study are useful in projecting both a schedule for developing tasks and the anticipated costs of development. A suggested task development schedule is presented in Figure 20. This schedule is prepared to enable a program to be fully operational in the sixth year after development begins.

Development Year	Academic Quarter	Program Years																											
		Yr. I			Yr. II			Yr. III			Yr. IV			S.			Yr. V			S.₂			Yr. VI			S.₃			Total
		d.	f.t.	op.	d.	f.t.	op.	d.	f.t.	op.	d.	f.t.	op.	d.	f.t.	op.	d.	f.t.	op.	d.	f.t.	op.	d.	f.t.	op.	d.	f.t.	op.	d
1	1							20																					20
	2							20	20																				20
	3							20	20																				20
	①4							30	20					5															35
2	1							10	30	60	10																		20
	2								10	90	20	10																	20
	3									100	20	20																	20
	①4										30	20		5															35
3	1										20	30	50																20
	2											20	80	5						10						5			20
	3	5											100	5						10									20
	①4														20		10												10
4	1	5	3															3								5			10
	2		3		5													3								5			10
	3		4		5													4								5			10
	①4															20					20		10						10
5	1			3		3													3					3					
	2			3		3													3					3					
	3			4		4													4					4					
	①4																					20					20		
6	1						3																		3				
	2						3																		3				
	3						4																		4				
	①4																											20	
		10			10			100			100			20			10			20			10			20			300

Task Development Schedule
(Showing Phasing of Operational Start-Up)

FIGURE 20

Although some trainees would complete the program at the end of the sixth year, they would not have started the program in Year I as freshmen. This development scheme is based on the logic that the pre-service phase of the F.S.U. Model is most nearly comparable in intent to current pre-certification programs. Consequently, development work begins here so that trainees starting in development year three will operationally enter the program at the pre-service level even though they have not had the work of the underclass phase.

Development work on the underclass program does not begin until late in development year three and the first full group of students does not enter this phase until development year five. The first group of trainees with the total three phase training would complete the program approximately the tenth year after development begins.

Alternative schemes are possible. Beginning development activities with the underclass phase could yield initial program finishers who had been through all three phases as early as the seventh year after the beginning of development. However, as a plan for development, this latter alternative presents several difficulties and few real benefits greater than the plan presented in Figure 20. The greatest problem is encountered in keeping a level or decreasing demand on development staff in terms of "task units" to develop.

A second difficulty is the extent to which there are still major problems to be solved regarding location (junior college, university or both) and procedures for offering the underclass phase. As mentioned earlier and to be discussed in the next section, certain programmatic and logistical problems were encountered as the feasibility study progressed that will probably require some programmatic replanning of this underclass phase. The pre-service phase is simply more nearly ready for full scale development activity than is the underclass phase.

The third problem is that a trainee population must be recruited and oriented to beginning such work in their freshman year. At Florida State University, for example, students now take little if any work in professional education until their junior year. Time will be needed to complete groundwork for this institutional change. All factors considered, the plan presented generates maximum development activity in the early years of development and progresses through field testing to full operation in an orderly and tapering fashion. It also seems to have the greatest potential for effecting changes in training programs at an early date.

The prototype yielded a sound basis upon which to estimate development costs since the prototype was indicative of the parameters of both development and operation. On the basis of this experience, it is now estimated that the cost of developing and field testing a "task unit" would be approximately $7,500. When applied to the yearly tasks to be developed as ascertained from Figure 20, the following sample budget is indicative of the costs to anticipate in fully developing a program based on the FSU Model:

Certain anticipated development costs are not included in the sample five-year budget presented in Figure 21. For example, no costs are included for commercial production of instructional materials in any finished format. There was no information generated during this study on the basis of which to project such costs. However, it appears reasonable to anticipate prorating production costs across the trainee population as a direct materials charge to each trainee such as is done for textbook, laboratory fees and other individually consumable materials. This procedure will require a sizable capital investment on the part of industry. Industry has made this investment in the past, but there does not yet exist any specific commitment to produce such instructional materials as needed for the operation of such a program.

With the exception of computer equipment, capital facilities and equipment costs are not included in Figure 21 amounts. Whether or not a significant facilities cost will be incurred as a "start-up" factor is dependent upon existing institutional facilities availability and upon decisions to acquire permanent housing as described in earlier paragraphs of this chapter or to lease appropriate space elsewhere.

Capital equipment costs for electronic equipment necessary to begin operation of this program could exceed $75,000 for audiovisual items essential to operation of the Resource Center and the Training Center. Other equipment such as furniture would again be dependent on existing availability unique to particular institutions.

Major Areas of Development Costs

Development Year	Develop Task Units		Develop and Test Entry Diagnostic	Develop and Equip Computer Management System	Carry On Faculty Training Program	Totals
	No.	Cost($)				
1	95	712,500	25,000	225,000	--	962,500
2	95	712,500	25,000	175,000	25,000	937,500
3	70	525,000	25,000	--	75,000	625,000
4	40	300,000	--	--	50,000	350,000
5	0	--	--	--	50,000	50,000
TOTALS	300	2,250,000	75,000	400,000	200,000	2,925,000

Sample Five-Year Development Budget

Figure 21

The development cost estimates must be recognized as exceedingly tentative although based on actual prototype development costs. It is reasonable, however, to generalize from such an estimate that by far the greatest portion of development costs will be personnel salary costs. (Major construction or renovation of physical facilities would also constitute a large expenditure if an institution chooses to include this in development costs.)

The total anticipated cost to develop a program based on the FSU Model may appear to be high. Full scale development costs may exceed $3,000,000 and hardly seem feasible or defensible when projected for a small population of trainees. However, the cost can be prorated over time to a large number of program completions particularly if program completion yields a significant number of persons who remain in the elementary teacher role for full careers of service. Thus, the larger and more career oriented the target population, the more reasonable the program cost becomes.

Constraints

Any system is susceptible to being rendered inefficient or even destroyed by forces which are present but unaccounted for in the final design. For instance, a program requiring ten faculty members to function smoothly may operate only poorly, if at all, with only six faculty members. If it operates at all, major changes must be made in the program to accomodate this shortage. All of the parameters discussed in the previous sections of this chapter serve to constrain program operation. Provision of the staff, funds, or facilities as needed is, by definition, a constraint on the system.

Not all constraints are fiscal in nature. A number of non-fiscal factors serve to constrain successful implementation of the FSU Model. Unless the system itself can be modified to adequately accomodate to these constraints, then the feasibility of implementing the FSU Model must be seriously questioned. Put another way, these constraints constitute a group of problems for which solutions must be found if the program is to be successful. A number of such constraints are discussed in following paragraphs and alternatives posed as solutions to some of them.

Performance Expectancy as a Constraint

The F.S.U. Model clearly calls for establishment of a performance based program. This means that performance measured against specified criteria determine the rate of progress toward completion of the program. The passage of any specified amount of time is irrelevant to program completion. This one feature, not unique to the F.S.U. Model alone, dictates a number of institutional changes if the training "system" is to function.

In the first phase, institutions of higher learning generally confer credit and even degrees for hours per week spent in an instructional activity (usually a lecture). When credits reach a magical sum, a program is complete, and certification as a teacher is awarded But in a performance based program, the time a trainee spends pursuing available instructional options cannot yield credit. Only the results of those learning experiences in terms of demonstrated performance will yield credit.

Unless an institution finds it possible to alter its traditional scheme of awarding credit, it is not likely that the F.S.U. Model is feasible of implementation. Faculty senates and administrations must change their attitude about the value of a quarter or semester hour as a measure of credit earned. If the credit system must be kept, then a reasonable solution is to award a unit of credit on the basis of milestone tasks completed. Thus, if a trainee completed successfully tasks 005 and 010 of the prototype described in Chapter III, he might be awarded two credits for those performances. This credit would be forthcoming whether he chose to pursue instruction or not. Under this alternative solution, it is even theoretically possible for a trainee to complete all milestone tasks successfully and be awarded a total set of credits for professional education without pursuing any instruction.

Although the solution posed to the credit problem is entirely feasible within a single institution, the problem of transfer into or out of such a program is highly significant. Transfer of credit not identified as quarter or semester hours is difficult to interpret across institutions. How does "Model" institution certify credit to a "non-model" institution? Two solutions immediately seem feasible. The first involves provision of a blanket statement to all receiving institutions of the meaning of credit earned in the program. A second solution might resemble an elementary school report card where receiving institutions are told both the nature of the performances expected, and specifically what a given trainee has done, and the equivalent credit awarded. As always, the burden of acceptance rests on the receiving institution.

Transfer into the program causes little problem. Acceptance or non-acceptance of credit is irrelevant. Through use of the diagnostic entry skills batteries and by early completion of task performances, a trainee can enter the program where his experience and competence warrant and be granted credit for all tasks preceeding his entry level.

The performance versus time basis for credit imposes a further constraint in the form of necessary changes in certification procedures. Fortunately the national trend seems to be toward performance based certification. A minimal condition for successful implementation is at least state certification via program approval on an exception basis for such performance based programs. More ideally, the Model can influence state departments of education to recast their requirements for certification in performance terms.

Possibilities for Fragmentation

The very nature of a highly individualized and systematized performance based program acts as a constraint in terms of the "institutional press" on trainees. Among things traditionally oriented teacher education institutions have done well over the years is the indoctrination of novices with a philosophical stance toward the wholistic process of education. This indoctrination has seldom been the result of systematic planning, but nevertheless it has often been effective.

If not accommodated for, a program based on the F.S.U. Model may well create an entirely different press on trainees. There exists the possibility that a trainee's total view of education may be a very fragmented one, at least until such time as he begins to apply philosophical and other frames of reference to teaching during the in-service phase of this program.

This fragmentation need not occur, however. As described in Chapter III, all trainees meet several times weekly in reflective seminars. These seminars can be well used by trainees and faculty to reflect on how training "tasks" are related to the "whole" of education. Also, the high incidence of personal contact between staff and trainees due to the program counseling structure can further serve to insure continuation of this "philosophical press" to the extent desired by an implementing institution.

Junior College Constraints

The issue of credit for professional courses taken raises a major problem with regard to the entire underclass phase of the Model Program. Until present formulae change, funding of staff positions in the state institutions is dependent upon an F.T.E. formula based on the number of student hours generated. Quick reference to early portions of this chapter show a relatively low generation of faculty F.T.E. positions by the underclass phase of the program. As long as the program is offered only in the senior institutions, an ample number of staff are generated at the lower division level to efficiently staff this limited enrollment phase. But enrollment projections indicate that eighty percent of trainees entering the program will be junior college transfers. Thus, if offered at all, the underclass phase would have to be conducted primarily in the junior colleges.

The problems of implementing the underclass phase at junior colleges appear formidable. Junior college leaders (see Chapter V) appear willing to be a party to implementing the underclass phase, but are equally unwilling to do so unless done as credit producing work which thus generates faculty for their institutions. These same junior college leaders also seem to be saying that such work, if offered in their institutions, should transfer as credit to state universities other than the Model Program institutions.

Thus, the set of problems now encountered make it difficult to consider the underclass phase of the F.S.U.

Model to be feasible. Certainly widespread inter-institutional changes are demanded. At least significant modification of program expectancies will have to occur. If the program is implemented as designed in Phase I, then it would appear that all junior colleges and all senior institutions served would have to reach agreement on the nature of the underclass phase. This is going to be difficult to achieve in many states, including Florida.

Another solution to the underclass problem is to alter Phase I specifications to provide an alternate route to meeting the pre-professional expectancies of the program. One alternative would be to provide a condensed version of the program as the first group of tasks during the pre-service phase. This would have the effect of either lengthening time spent in program or reducing the academic work load which a trainee might carry concurrently with his professional work. Another alternative might be to encourage each junior college to offer its own version of an extended early-awareness-involvement program. In this alternative, feedback to the junior college on the success of its graduates could easily be furnished and could serve to support regular revision of the underclass "programs".

None of these solutions is optimal. If any aspect of the F.S.U. Model is not programatically feasible, it is the underclass phase. While each solution has some merit, the ideal program still seems to be the one specified in Phase I. The heavy trend toward junior college as the point of program entry simply offers a more severe constraint than originally anticipated during design.

The Institutional Reward System as a Constraint

For successful implementation, a program based on the F.S.U. Model needs to have the long-term support of actively involved faculty members. Capable faculty members will only participate fully when the institutional reward system is structured to support them in this endeavor. Salary increases, promotion, and tenure are visible rewards of the system, and in many institutions these rewards are granted only for recognized contributions in certain fields, notably research and writing. Only when a carefully worked out plan for supporting

Model Program participation is in effect will a program function smoothly with the best faculty available.

Program vs Departmental Structure

Closely related to the reward system is the constraining effect of the "total system" or "total program" nature of the F.S.U. Model. It is highly unlikely that the type of program designed can function efficiently without some official program administrative structure which takes basic precedence over departmental autonomy. In institutions where program funding and control are handled jointly by several cooperating but autonomous departments, true program operation is hardly feasible. In such instances, some type of program superstructure must be created through which responsible program funding and control can be exercised. Under this type of plan, departments service programs and in turn receive their funding from programs in direct proportion to their service to the program. Acceptance of this idea, although important to the ultimate success of any total program effort, is extremely difficult to acquire. Any institution implementing the F.S.U. Model would do well, however, to work toward this type of program structure if assurance of maximum feasibility is desired.

Limited Licensure

The F.S.U. Phase I specifications call for limited licensure of trainees at the completion of a bachelor's degree. This specification has proved to be highly controversial, although primarily for emotional rather than substantive reasons. It is pure speculation to suggest that the feasibility of successful implementation of the F.S.U. Model rests in any major way on the issue of limited licensure. It is highly probable that the pre-service/in-service program continuation is implementable with or without limited licensure. However, the concept is one which the F.S.U. Model staff sees in principle as an important and desirable change in the overall structure of commonly followed certification practices. The rationale for this position is well explicated in the Phase I report.

Limited licensure basically delays full professional certification until after a two-year probationary or intern experience. This is amply provided for in the "portal school" concept of the F.S.U. Model. It could be provided for in other ways by "non-model" institutions.

Pupil Availability

Probably the most evident constraint to implementation of the F.S.U. Model, particularly the pre-service phase of the program, is a requirement that elementary school pupils be readily available for flexible utilization in controlled environments for instruction by trainees. Unless these pupils can be provided, the total instructional model as described in Chapter II will simply not function.

Many of the task assignments given trainees require performance in simulated teaching settings with small numbers of pupil subjects. The public school classroom has never been an environment amenable to manipulative control by an agency or person other than the classroom teacher. To simulate specific teaching circumstances and to provide an opportunity for immediate application of theory to practice requires either control over public school classrooms or pupils brought to a campus setting.

Control of regular classrooms to any appreciable extent is neither possible nor desirable. Acquisition of a transient pupil population proved to be very possible for the prototype and should prove possible on a large scale. Classroom instruction is interrupted minimally if pupils are removed only once a month for use as subjects in the training program. This procedure is further enhanced by three bonus effects: (1) pupils can be exposed to new and challenging curricula while away from their own school; (2) classroom teachers can be freed one day per month for their own in-service activities; and (3) curriculum developers have accessible populations on which to field test new ideas and new materials. The prototype experience suggested enthusiastic teacher response to the idea and no parental complaint about the activity. Handled as described, it is feasible to provide the specific pupil populations when needed. But because they must be provided, it does place a distinct constraint on its operational procedures.

Staffing Constraints

Although already discussed in detail, constraints placed on the F.S.U. Model Program operation by new staff roles and needed trainee/staff ratios demand the use of differentiated staffing patterns for teacher education. Unless the utilization of many para-professionals is accepted as a valid means of staffing a training program, for purely fiscal reasons, the F.S.U. Model would not be feasible. By using teams consisting of professorial faculty and para-professionals, the program specifications can be met and budgets remain manageable.

Another very important concept is introduced here. The highly qualified, experienced classroom teacher has commonly been assigned only to the role of supervising-teacher, when in fact he often has much to offer the total teacher training process. The differentiated staffing concept makes it possible and feasible to utilize these teachers in maximally effective ways.

Management Capability

No aspect of the F.S.U. Model is more demanding than the set of specifications detailing a total management capability. This has been amply described in terms of computerized systems for managing instructional and fiscal aspects of the program. It would be folly to suggest that this Model could be implemented successfully for large trainee populations without this capability. The program is simply too complex and the level of individualization too complete to function with manual record keeping and management procedures. Chapter IV has presented a carefully researched and documented approach to meeting the management specifications. Other approaches are certainly possible, but it is doubtful that a better system is readily available at so reasonable a developmental or operational cost.

Two alternatives may be available to the small implementer of this Model. When the number of trainees is very small, it is not impossible to use simple hand-sort procedures to carry on the day-to-day management functions required for operation. The size of the trainee population will determine the feasibility of this alternative. The second, and possibly more attractive alternative, is to contract for management service on a per trainee basis with a large university, another institution implementing and managing the same model program, or with a private computer services firm. The teletype/telephone line access to such services is relatively simple and such inter-institutional tie-ups are becoming more and more commonplace. For any institution graduating less than 100 trainees annually, the approach to management capability may be well worth study.

Input Constraints

Given the typical funding constraints placed on program operation in state institutions, a regular and systematic assessment must be made of the dynamic relationship between program input (students and dollars) and output (teachers trained). The fiscal theories upon which the management system for the F.S.U. Model is built suggest that to increase demand by increasing input of trainees will probably decrease rather than increase the output of trainee completions. The entire program is dependent upon the availability to a trainee of instructional resources, pupil subjects, and the appropriate facilities when he is ready for them. To exceed density limits means that for a percentage of the time trainees will have to slow down progress through the program, thus delaying completion time. The management system described in Chapter IV can ultimately be utilized to determine the optimal factor by which density can be exceeded so that completion time is only minimally delayed. This may be more productive from a cost standpoint than materially increasing capital and operating expenditures. Once this optimal factor is exceeded, however, one of several alternatives must be considered: First, enrollment limits can be established (trainee input) congruent with optimal program completions (output) in order to ensure efficiency; Second, costs (dollar input) can be allowed to rise by providing funds for greater facilities capability and greater resources beyond reasonable cost-effectiveness ratios; Third; the entire program structure can be re-evaluated with an eye to stalling cost increases by reducing quantity or quality of instruction programs. When the management system is fully developed, the capability will exist to make valid input/output decisions on a cost-effective basis.

Basic Development Constraint

The final constraint is that of an extremely demanding development requirement. A development schedule was discussed in an earlier section of this chapter. Both in terms of dollar expense and the expertise needed, the development task will be immense. Basic materials must be designed, developed and field tested. The management system must be fully developed, equipped and debugged. Faculty in large numbers must be trained and retrained. No institution should consider lightly the responsibility it assumes when it takes on such a development task. It will require high level administrative commitment to effect the institutional changes already referred to. It will require highly motivated faculty to accept the tremendous development challenges. It will require many firm inter-institutional commitments which must from the start exceed mere indications of interest. It will require a "hands-on" partnership between a state education agency without which the enterprise cannot succeed. It will ultimately require total university commitment to make necessary institutional changes such as changing credit requirements, eliminating grade requirements in lieu of task completion indicators, and providing incentives to promote necessary inter-disciplinary staffing. It will require firm, pre-development commitments on a university and state level to fully support the operation of such a program once it is operable. Given these commitments and successful adaptions to meet other constraints, the F.S.U. Model can be successfully implemented.

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APPENDIX A

Task Assignments for Three Week Prototype

Task 001 (Time limit: 10 minutes)

Present to the pupils a group of ten non-verbal sounds using a medium of your choice (tape recorder, teacher-made sounds, etc). While the goal of the lesson is the pupils' identification of at least seven of the sounds, you will be judged on your ability to establish rapport and your ability to give instructions clearly, as well as on performance of the task.

Task 002 (Time limit: 10 minutes)

Present ot the pupils, using a medium of your choice, a group of non-verbal sounds for them to classify. Example: High-low; happy-sad; urban-rural; warning; animal sounds. While the goal of the lesson is the pupils' classification of sounds, you will be judged on your ability to establish rapport and give instructions clearly, as well as on performance of the task.

Task 003 (Time limit: 10 minutes)

Plan and present a lesson on following oral directions. A majority of the pupils will be expected to follow the directions in sequence with no errors. In addition to performance of the task, you will be judged on your ability to give a sequential series of explicit directions and on your choice of appropriate behavioral objectives. (Example: give a set of oral directions as to how to draw a geometric design which the pupils do not see, but must draw only from your directions.)

Task 004 (Time limit: 20-30 minutes)

Plan and present a lesson in which the pupils react to non-verbal sounds by expressing their reactions through painting, writing, oral description or dramatization. Your choice of behavioral objectives and appropriate strategies for them will contribute to successful performance of this task.

Task 005 (Time limit: 15-20 minutes)

Plan and present a lesson in which you read a story to pupils in order to develop such listening skills as finding main ideas, recalling details, drawing conclusions, making inferences. Along with task performance, you will be judged on competence in writing behavioral objectives and formulating a complete teaching strategy.

Task 006 (Time limit: 15-20 minutes)

In this lesson you will elicit from the pupils ideas and words associated with the concept RIVER. Skill in planning and presentation will be judged by the performance of the task.

Task 007 (Time limit: 15-20 minutes)

Plan and present a lesson in which you use a "closed strategy" to elicit a list of ideas concerning the concept RIVER, using groups and labels which you have established.

Task 008 (Time limit: 15-20 minutes)

Plan and present a lesson in which you use an "open strategy" to elicit, group, and label a list of ideas concerning the concept RIVER.

Task 009 (Time limit: 15-20 minutes)

In this task you will direct the pupils to find similarities and differences between two related concepts.

Task 010 (Time limit: 30 minutes)

In this task, you will use a direct or vicarious experience to develop or enlarge the pupils' concept in some area of your choice.

TASK 002

Time limit: 10 Minutes

Present to the pupils, using a medium of your choice, a group of non-verbal sounds for them to classify. Example: High-low; happy-sad; urban-rural; warning; animal sounds. While the goal of the lesson is the pupils' classification of sounds, you will be judged on your ability to establish rapport and give instructions clearly, as well as on performance of the task.

Strategies: Choose A or B according to the age level with which you will work.

A. Ages 5-8

1. Establish rapport (introduce self, ask pupils' names).
2. Introduce the topic. You might give an example of a group of sounds (animal sounds). Discuss why the sounds belong together.
3. Present a series of sounds as suggested in the materials listed below. You might tell the pupils the names of the classifications you are using.
4. Have the pupils identify sounds and the group they belong to while you note the responses on an experience chart or chalkboard.

B. Ages 9-12

1. Establish rapport (introduce self, find out pupils' names).
2. Introduce topic. You might ask pupils to suggest a series of sounds which could be classified together.
3. Present a series of sounds as suggested as suggested in the materials below.
4. Have pupils classify sound on paper. You might ask the pupils to name the classification as well as the individual sounds.
5. Have pupils orally explain their choices.

Materials: Choose your own. The following are suggestions you may choose or you may wish to use others.

1. Record of farm sounds or city sounds. (American Book Company).
2. Musical instrument for high and low sounds (guitar, flutaphone).
3. Record of "Peter and the Wolf" (have pupils tell why the various instruments were chosen to represent certain animals).
4. Relate sounds to mood--happy or sad, friendly or scary.
5. Ask if a sound may mean different things at different times. (Branch scraping on a window--does it mean the same thing on a bright sunny day as it would on a dark night when you are in bed in your room alone?)
6. See card file for further suggestions.

TASK 002

ENABLERS AND OPTIONS

To perform this task you will probably need some or all of the following:

002: Ability to name some developmental tasks of early childhood and middle childhood. (Example: developing a conscience.)

To acquire this ability you may do any or all of the following options:

101 See file folder on "Developmental Tasks."
201 See Havighurst's Human Development and Education, Chapters 2, 4, 8.
3-- Free Choice.

See Resource Center attendant for proficiency test.

003: Ability to match the different physical, emotional, social and mental growth characteristics to the proper age group. (Example: vocabulary level, span of attention.)

101 See file folder on "Characteristics" and "See How They Grow."
203 View film(s): "Developmental Characteristics of Pre-Adolescents," "Elementary School Children: Part II Discovering Individual Differences," "From Sociable Six to Noisy Nine."
3-- Free Choice.

Sign on CAI terminal and ask for proficiency test.

004: Ability to establish rapport with children.

104 Arrange to view a video tape illustrating some techniques of establishing rapport (available in Resource Center.)
206 Attend a seminar or consultation which you may ask for on establishing rapport.
3-- Free Choice.

Sign on CAI terminal and ask for proficiency test.

005: Ability to give instructions clearly and concisely and to identify some of the requirements for instruction giving.

101 See card file on "Oral Directions."
208 Practice with a tape recorder and check for clarity, enunciation.
3-- Free Choice (Ask for counseling.)

Sign on CAI terminal and ask for the proficiency test.

006: Ability to explain how sound identification relates to developing auditory discrimination.

101 Read for information in Resource Center. See Card File on "Listening." See Listening Aids Through the Grades.
207 SRA Listening Skills Program, Reel I and Teachers' Guide.
3-- Free Choice.

See Resource Center attendant for proficiency test.

TASK 006

Time limit: 15-20 min.

In this lesson you will elicit from the pupils ideas and words associated with the concept RIVER. Skill in planning and presentation will be judged by the performance of the task.

Suggestions for Presentation:

In Set I, you encountered techniques for planning your Tasks. There will be no directions in Set II on how to plan; we presume you will want to use some of the skills learned in Set I to help you perform Set II.

In this Task, you are to encourage the pupils to list words they associate with RIVER. Before you think about performing the task, try to list words and ideas you associate with RIVER, such as words that have to do with transportation, geographic characteristics, etc. Then think of ways you might initiate such thinking on the pupils' part.

ENABLERS AND OPTIONS

To perform this task you will probably need some or all of the following:

002: Ability to identify differences and similarities in word associate responses given by pupils about a given concept.

105 Seminar to be scheduled.
209 Make arrangements with the scheduler to check out two pupils and hold a discussion with them.
3-- Free Choice.

Check the Resource Center attendant for proficiency test on this enabler.

003: Ability to set the stage for learning.

104 See video tapes:
(1) "Setting the Stage for Learning",
(2) "Classroom Climate".

201 Read for information:
  (1) Chapter 5, The Psychology of Learning and Instruction, John P. DeCecco.
  (2) Reference file, "Classroom Climate."
3-- Free Choice.

Sign on CAI terminal and ask for proficiency test on this enabler.

004: Ability to identify the characteristics and purposes of good questioning techniques.

101 See file folder on:
  (1) Guiding Learning through Skillful Questioning.
  (2) Improvement in the Use of Questions.
  (3) Basic Questioning Techniques.
  (4) The Wording and Form of Questions.
204 See video tape on questioning.
3-- Free Choice.

Sign on CAI terminal and ask for proficiency test.

005: Ability to identify different types of concepts and the reasons for developing pupils' concepts in the classroom.

101 See file folder on:
  (1) The Meanings of Concepts.
  (2) Reasons for Concept Development.
205 Attend seminar, Concept Development I.
3-- Free Choice.

Sign on CAI terminal and ask for proficiency test.

006: Ability to name four word-associates for RIVER in each of the categories (a) synonyms (b) characteristics (c) uses and purposes and (d) associative characteristics.

103 Arrange to see one or more of the following films: "Amazon," "Colorado," "Life Along the Waterway," "Life in the Nile Valley," "Mississippi River: Background for Social Studies," "Rhine River: Background for Social Studies."
211 Look through several social studies books for ideas which are taught about rivers.
3-- Free Choice.

See Resource Center attendant for proficiency test.

MEDIA OPTIONS CODE

00	Miscellaneous
01	Resource Center written materials
02	FSU library materials
03	16 mm. film(s)
04	Prepared VTR
05	Instructional seminar
06	Consultation (individual or small group)
07	Audio tape
08	Practice with AV equipment
09	Practice with pupils
10	Students textbooks
11	Social studies materials
12	Proficiency test
13	Task oriented lecture
14	Teaching aids

Must Do Both

21	Filmstrip and audio tape
22	Filmstrip, audio tape, Resource Center materials
23	FSU library, Resource Center, audio tape
24	Instructional Seminar and VTR
25	Seminar and write questions, and VTR and discussion
26	Video tape and Resource Center materials

APPENDIX B

TASK 006
PROTOTYPE OBSERVATION GUIDE

Trainee Name________________ Date____________________

Task Number_________________ Class Observed:Level__Size___

Observer____________________ Time Started____________

Task Completed______________ Time Finished___________

Reteach_____________________

Directions: At the end of the session, circle 1, 2, 3, or 4 for each item. In order for the task to be completed, the trainee must average a score of 3 on this part.

1 = poor 2 = fair 3 = good 4 = strong

1. Trainee set the stage for learning, e.g., asked a leading question, made pupils aware of discussion format, related the concept "river" to the pupils.

   1 2 3 4

2. Trainee used questioning techniques appropriately, e.g., used questions to focus on topic, redirect focus, clarify answers.

   1 2 3 4

3. Trainee identified differences and similarities in responses given by pupils about a given concept. (How student remarks are handled)

   1 2 3 4

Comments:

Directions: At the end of introductory remarks, circle a 1, 2, or 3 for each statement in Part I. At the end of the teaching session complete Part II.

1 = event occurred   2 = no occurrence
3 = not appropriate for the session

PART I

Trainee Oriented

1. 1 2 3 Trainee (T) had pupils (P) attention before starting.
2. 1 2 3 T retained pleasant manner.
3. 1 2 3 T introduced self, asked pupils' names, etc.
4. 1 2 3 T introduced topic of lesson.
5. 1 2 3 T explained purpose of lesson.
6. 1 2 3 T gave directions appropriately.
7. 1 2 3 T at ease.

Pupil Oriented

8. 1 2 3 Ps were attentive.

PART II

Trainee Oriented

9. 1 2 3 T remained at ease throughout lesson.
10. 1 2 3 T spoke clearly and distinctly.
11. 1 2 3 T operated equipment and/or materials smoothly.
12. 1 2 3 T used praise or encouragement.
13. 1 2 3 T paced lesson appropriately for age group.
14. 1 2 3 T handled behavior problems.

Pupil Oriented

15. 1 2 3 Ps were attentive.
16. 1 2 3 Ps initiated talk.
17. 1 2 3 Ps showed friendliness toward trainee.
18. 1 2 3 Ps appeared at ease with trainee.
19. 1 2 3 P and T personal relationship harmonious.
20. 1 2 3 Ps followed directions as given.

Content Oriented

21. 1 2 3 Lesson organized (preparation, sequence).
22. 1 2 3 Vocabulary appropriate to age group.
23. 1 2 3 Children reached criterion performance (if time allows).
24. 1 2 3 Appropriate strategy was used.

APPENDIX C

INSTRUCTIONAL MANAGEMENT PRINTOUTS

(SAMPLES)

```
                              FLORIDA STATE UNIVERSITY
                              ELEMENTERY MODEL PROJECT

                             STUDENT PERFORMANCE REPORT

STUDENT NUMBER                                                          STUDENT NAME
  261021618                                                        STEPHENS MARCIA LYNN

                                 ACTUAL       AVERAGE     STANDARD    COMPLETION    NUMBER
   TASK  SUB-TASK  OPTION     PERFORMANCE   PERFORMANCE   DEVIATION      TIME      ATTEMPTS
   002     002      101           99           99.00         0.0          .2          1
   002     002      201           00           00.00         0.0          .1          1
   002     002      ***           50           00.00         0.0          .3          1
   002     003      101           75           75.00         0.0          .4          1
   002     003      ***           75           00.00         0.0          .4          1
   002     004      104           90           85.00         5.0          .3          1
   002     004      ***           90           00.00         0.0          .3          1
   002     010      3PT           99           99.00         0.0          .5          1
   002     010      ***           99           00.00         0.0          .5          1
   002     ***      ***           99           99.00         0.0         1.5          1
   003     003      221           00           67.83        23.6          .5          1
   003     003      ***           00           00.00         0.0          .5          1
   003     004      107           77           65.45        24.7          .5          1
   003     004      209           45           40.66        31.5          .2          1
   003     004      ***           61           00.00         0.0          .7          1
   003     010      2PT           99           99.00         0.0          .5          1
   003     010      3PT           00           73.68        42.5          .5          1
   003     010      ***           50           00.00         0.0         1.0          1
   003     ***      ***           99           99.00         0.0         2.2          2
   005     002      122           45           25.00        36.7          .5          1
   005     002      226           01           19.22        27.2          .5          1
   005     002      ***           23           00.00         0.0         1.0          1
   005     003      201           45           79.28        27.8          .1          1
   005     003      ***           45           00.00         0.0          .1          1
   005     010      3PT           99           99.00         0.0          .8          1
   005     010      ***           99           00.00         0.0          .8          1
   005     ***      ***           99           99.00         0.0         1.9          1
   006     003      104           83           62.33        29.5          .2          1
   006     003      ***           83           00.00         0.0          .2          1
   006     004      101           70           63.66        25.4          .6          1
   006     004      204           45           55.40        33.2          .           1
   006     004      ***           58           00.00         0.0          .6          1
   006     006      211           45           41.75        27.4          .2          1
   006     006      310           45           22.50        22.5          .2          1
   006     006      ***           45           00.00         0.0          .4          1
   006     010      3PT           99           99.00         0.0          .8          1
   006     010      ***           99           00.00         0.0          .8          1
   006     ***      ***           99           99.00         0.0         2.0          1
   007     003      207           45           46.40        19.3          .3          1
   007     003      ***           45           00.00         0.0          .3          1
   007     010      3PT           99           99.00         0.0          .6          1
   007     010      ***           99           00.00         0.0          .6          1
   007     ***      ***           99           99.00         0.0          .9          1
   008     010      3PT           99           99.00         0.0          .8          1
   008     010      ***           99           00.00         0.0          .8          1
   008     ***      ***           99           99.00         0.0          .8          1

                                              STUDENT SUMMARY
     TOTAL COMLETED                 PROGRAM    AVERAGE TIME                 TASKS ATTEMPTED
TASKS SUB-TASKS OPTIONS           TOTAL TIME       TASK           ONCE  TWICE    THREE TIMES
  6       17       23                18.6          3.1             05     01         00
```

```
                                      STUDENT TASK PERFORMANCE REPORT

                                             --------OPTION 1--------- --------OPTION 2--------- --------OPTION 3---------
STUDENT    TASK TIME TIME  PERFORMANCE SUB   OPT  STD  ACT  STD  ACT   OPT  STD  ACT  STD  ACT   OPT  STD  ACT  STD  ACT
NO/NAME     NO  ENTR COMP  1   2   3   NO    CD   TIME TIME PERF PERF  CD   TIME TIME PERF PERF  CD   TIME TIME PERF PERF

261021618  002  1006 1007  99
STEPHENS MARCIA LYNN
                                       002   101  0001 0002 99   99    201  0007 0001 99   00
                                       003   101  0007 0004 99   75
                                       004   104  0007 0003 99   90
                                       010                                                     3PT  0005 0005 99   99

           003  1007 1008  00  99
                                       003                             221  0015 0005 77   00
                                       004   107  0005 0005 99   77    209  0005 0002 99   45
                                       010                             2PT  0005 0005 99   99    3PT  0005 0005 99   00

           005  1013 1016  99
                                       002   122  0007 0005 77   45    226  0005 0005 77   01
                                       003                             201  0003 0001 99   45
                                       010                                                     3PT  0008 0008 99   99

           006  1017 1021  99
                                       003   104  0002 0002 99   83
                                       004   101  0007 0006 99   70    204  0002      99   45
                                       006                             211  0007 0002 77   45    310  0005 0002 77   45
                                       010                                                     3PT  0008 0008 99   99

           007  1021 1022  99
                                       003                             207  0007 0003 99   45
                                       010                                                     3PT  0006 0006 99   99

           008  1022 1023  99
                                       010                                                     3PT  0008 0008 99   99

261028291  001  1006 1007  99
OSBORNE BETSY
                                       004   104  0002 0005 99   99
                                       005   101  0005 0002 99   90
                                       010                                                     3PT  0005 0005 99   99

           003  1008 1009  00  99
                                       002                             201  0015 0006 77   77
```

```
                          FLORIDA STATE UNIVERSITY
                          ELEMENTRY MODEL PROJECT

                     PERFORMANCE RELATED TO RESOURCE USED

STUDENT NUMBER                                           STUDENT NAME
 261021618                                      STEPHENS MARCIA LYNN

   RESOURCE          AVERAGE        AVERAGE       STANDARD       PERCENT OF
     CODE             TIME        PERFORMANCE     DEVIATION     TIMES CHOSEN
      01               0.2            57.80          33.6            21.73
      04               0.1            72.66          19.7            13.04
      07               0.4            61.00          16.0             8.69
      09               0.2            45.00           0.0             4.34
      10               0.2            45.00           0.0             4.34
      11               0.2            45.00           0.0             4.34
      21               0.5             0.00           0.0             4.34
      22               0.5            45.00           0.0             4.34
      26               0.5             1.00           0.0             4.34
      PT               0.6            84.85          34.6            30.43
```

FLORIDA STATE UNIVERISTY
ELEMENTRY MODEL PROJECT

REPORT OF PARTICULAR CHARACTERISTICS
JUNIOR COLLEGE COLLEGE TRANSFERS

TASK	SUB-TASK	OPTION	AVERAGE PERFORMANCE	STANDARD DEVIATION	AVERAGE TIME	NUMBER OF STUDENTS	PERCENT REPEATING
003			99.00	0.0	0.5	12	8
	002		00.00	0.0	0.0		
		101	15.33	20.9	0.9	3	
		201	59.00	28.4	0.4	6	
	003		00.00	0.0	0.0		
		101	43.25	29.3	0.6	4	
		221	65.00	22.6	0.8	11	
		301	77.00	0.0	0.1	1	
	004		00.00	0.0	0.0		
		104	62.88	26.6	0.4	9	
		209	40.66	31.5	0.3	3	
		306	00.00	0.0	0.7	1	
	010		00.00	0.0	0.0		
		2PT	99.00	0.0	0.5	3	
		3PT	73.50	42.5	0.5	12	

```
                                             FLORIDA STATE UNIVERSITY
                                             ELEMENTRY MODEL PROJECT

                                                SUMMARY -  RESOURCE USAGE

RESOURCE      AVERAGE      AVERAGE       STANDARD     PERCENT OF                      DESCRIPTION
  CODE          TIME     PERFORMANCE    DEVIATION    TIMES CHOSEN
   00           1.2          0.00          0.0           0.22       MISCELLANEOUS
   01           0.6         67.93          2.8          33.48       RESOURCE CENTER WRITTEN MATERIALS
   02           0.5         41.80          3.7           1.11       FSU LIBRARARY MATERIALS
   03           0.5         59.60          3.2           3.34       16 MM FILMS
   04           0.4         67.98          2.8          11.38       PREPARED VTR
   05           0.3         64.50          2.8           1.33       INSTRUCTIONAL SEMINAR
   06           0.4         33.16          4.6           1.53       CONSULTATION -INDIVIDUAL OR SMALL GROUP-
   07           0.5         60.54          2.7           7.81       AUDIO TAPE
   09           0.3         40.66          3.1           0.66       PRACTICE WITH PUPILS
   10           0.3         64.33          1.4           0.66       STUDENT TEXTBOOKS
   11           0.5         35.33          2.7           1.33       SOCIAL STUDIES MATERIALS
   12           0.0         96.00          0.0           0.22       PROFICIENCY TEST
   14           0.1         45.00          0.0           0.22       TEACHING AIDS
   21           0.8         64.07          2.8           3.12       FILM STRIPS AND AUDIO TAPE
   22           0.5         25.00          3.6           2.00       FILMSTRIP, AUDIO TAPE, RESOURCE CENTER MATERIALS
   26           0.6         21.50          2.8           1.78       VIDIO TAPE AND RESOURCE CENTER MATERIAL
   PT           0.7         94.50          2.0          29.91
```

```
                              FLORIDA  STATE  UNIVERISTY
                              ELEMENTRY  MODEL  PROJECT
                                LAST TASK COMPLETED
TASK NO.       SOCIAL SECURITY NO.        STUDENT NAME                          FREQUENCY

  006              261028291               OSBORNE BETSY                            16
  007              265022608               RANDLE CAROLYN                           17
  007              261842533               PRATER MARY                              17
  008              267849675               OLSON JOANNE                             15
  008              266888223               THIBAULT JAMES                           15
  008              262887750               STOCK DIANE MARY                         15
  008              261021618               STEPHENS MARCIA LYNN                     15
  009              267760300               SEARCY JUDITH                            12
  009              266947581               SPANO PATRICIA                           12
  009              264840422               PLUMMER BARBARA                          12
  009              263909639               SEUSS CAROLYN E                          12
  009              263822436               SMALL SUSAN                              12
  009              263028644               THROWER KATHY MARGARET                   12
  009              262987822               RESER KATHLEEN                           12
  009              262846508               SHUMAN SUSANNE                           12
  009              261821181               STEPHENSON MARY BERNRUTER                12
  010              308503475               SHELTON ALICE                             3
  010              262969335               REED SUSAN                                3
  010              262968618               SAYERS MARIA                              3
```

```
TASK NUMBER  003                                    TASK PERFORMANCE REPORT

                     NUMBER OF          PERCENT            AVERAGE       AVERAGE           STANDARD         NUMBER PASSING
                      STUDENTS          ELECTED             TIME       PERFORMANCE        DEVIATION          ON FIRST TRY
OPTION      101          4                21.0              001.1          30.75             032.2                 4
OPTION      201          9                47.3              000.4          65.00             024.7                 9

SUB-TASK    002

OPTION      101          7                36.8              001.0          63.71             032.6                 7
OPTION      221         12                63.1              000.8          67.83             023.6                12
OPTION      301          1                05.2              000.1          77.00             000.0                 1

SUB-TASK    003

OPTION      107         11                57.8              000.4          65.45             024.7                11
OPTION      209          3                15.7              000.3          40.66             031.5                 3
OPTION      306          1                05.2              000.7          00.00             000.0                 1

SUB-TASK    004

OPTION      2PT          4                21.0              000.5          99.00             000.0                 4
OPTION      3PT         16                84.2              000.5          73.68             042.5                16

SUB-TASK    010

TASK        003         16                84.2              002.6          90.00             000.0                12
```

APPENDIX D

STUDENT ATTITUDE TOWARD ELEMENTARY MODEL PROTOTYPE

This is not a test of information; therefore, there is no one "right" answer to a question. We are interested in your opinion on each of the statements below. Your opinions will be strictly confidential. Do not hesitate to put down exactly how you feel about each item. We are seeking information, not compliments; please be frank. Read each statement carefully and then fill in the appropriate blank on the answer sheet using the following key:

1 2 3 4 5
Strongly Agree-Agree-Uncertain-Disagree-Strongly Disagree

1. As a change of pace from usual classroom learning the prototype simulation was welcome.

   1 2 3 4 5

2. All of the students enjoyed the prototype.

   1 2 3 4 5

3. I would rather learn the tasks some other way than the prototype.

   1 2 3 4 5

4. I would choose to participate in the prototype rather than participate in a group discussion on the topic.

   1 2 3 4 5

5. The time spent on the prototype was completely wasted.

   1 2 3 4 5

6. There is a definite need for instructional simulation.

   1 2 3 4 5

7. The value of simulation is overestimated by some people.

   1 2 3 4 5

8. In preference to lectures on the same subject, I would like to try more instructional simulation.

   1 2 3 4 5

9. The prototype was stimulating.

1 2 3 4 5

10. Only a few of the students enjoyed the simulation prototype.

1 2 3 4 5

11. Universities should use class time for instructional simulation.

1 2 3 4 5

12. The prototype I participated in was interesting.

1 2 3 4 5

13. Instructional simulation should be considered a valuable part of teacher education.

1 2 3 4 5

14. I was inspired by this prototype to make full use of my capabilities.

1 2 3 4 5

15. The experience was not particularly beneficial.

1 2 3 4 5

16. In view of the amount of time involved, I feel too little was accomplished.

1 2 3 4 5

17. This simulation increased my knowledge in this subject area.

1 2 3 4 5

18. I found it difficult to concentrate on learning anything.

1 2 3 4 5

19. I would have learned more from a lecture.

1 2 3 4 5

20. I learn more from the prototype than from individual study.

1 2 3 4 5

21. I learn more from the prototype than from group discussion.

1 2 3 4 5

22. The students don't remember anything they learned in the prototype.

1 2 3 4 5

23. Participating in a prototype such as this one is the most effective way to learn about teaching.

1 2 3 4 5

24. Simulation does not provide the necessary motivation to learn the subject.

1 2 3 4 5

25. This prototype is not worth the time and effort involved.

1 2 3 4 5

26. The prototype was fun to me.

1 2 3 4 5

27. The prototype made me feel uncomfortable and irritable.

1 2 3 4 5

28. My liking for the prototype outweighs my disliking.

1 2 3 4 5

29. When I hear the word simulation or prototype I have a feeling of dislike.

1 2 3 4 5

30. I approach simulation with a feeling of hesitation, resulting from fear of doing poorly.

1 2 3 4 5

31. The feeling I have toward simulation is a good feeling.

1 2 3 4 5

32. I feel a definite positive reaction to the prototype.

1 2 3 4 5

33. The material covered by this prototype was uninteresting.

1 2 3 4 5

34. I'll remember what I learned in the prototype.

1 2 3 4 5

35. During internship, the information obtained from this prototype will be valuable.

1 2 3 4 5

36. I don't know any more about teaching than when I started.

1 2 3 4 5

37. I learned while participating in the prototype, but it was hard work.

1 2 3 4 5

38. This prototype has no influence upon the trainees.

1 2 3 4 5

39. I participated because I had to.

1 2 3 4 5

40. I felt like getting involved in the prototype.

1 2 3 4 5

41. I didn't apply myself.

1 2 3 4 5

42. I felt like learning the material so I could improve my performance.

1 2 3 4 5

43. I worked hard participating in the prototype.

1 2 3 4 5

44. This prototype is not appropriate for teacher training.

1 2 3 4 5

45. When the tasks became difficult, I gave up.

1 2 3 4 5

46. I found myself just trying to get through the tasks rather than trying to learn.

1 2 3 4 5

47. It was difficult to become motivated within the prototype context.

1 2 3 4 5

48. I felt insecure participating in the prototype.

1 2 3 4 5

49. I felt at ease participating in the prototype.

1 2 3 4 5

50. I was under a strain while participating in the prototype.

1 2 3 4 5

51. This was a confusing prototype.

1 2 3 4 5

52. I wasn't satisfied with how I performed in the prototype.

1 2 3 4 5

53. I didn't know what I was doing during the prototype.

1 2 3 4 5

APPENDIX E

FISCAL MANAGEMENT SYSTEM
FOR THE
F.S.U. ELEMENTARY TEACHER PREPARATION MODEL

The Problem

Increasing societal demands for more effective and relevant education are forcing educators and administrators alike to explore possible methods of achieving greater utilization of existing resources. Educators, like corporate executives, must strive to get the greatest contribution possible from operations. In the past, educators have often made haphazard and random choices among instructional alternatives. This was often due to the lack of data regarding costs and benefits. Unfortunately, there has been little research on the actual effectiveness of the educational system or the relation between the cost and benefits of instructional programs. This being the case, many major educational decisions regarding resource allocation are made largely on the basis of intuition. Intuition alone is not a satisfactory basis for decision-making. When resources are limited, the efficiency of resource allocation is a critical problem.

However, the present budgeting and accounting systems of many public institutions lack the qualities for providing meaningful information to administrators of programs such as will be based on the Elementary Teaching Model. For instance, at Florida State University the accounting system is concerned only with departmental (Elementary Education is one of some 200 educational departments) totals of expenditures in the categories of full-time salaries, part-time salaries, expense and operating capital outlay. Being object oriented and primarily directed toward control of departments, rather than being program oriented and primarily directed toward the planning function, such a system offers very little in the form of financial information for a program which transcends departmental boundaries.

The fact that tasks, enablers and the instructional options developed for the Elementary Model Program are program oriented and thus transcend departmental boundaries, encourages and even demands the application of modern fiscal (program) practices.

To ascertain the cost-effectiveness of a prototype or a full operational training program would be difficult, if not impossible, under existing education accounting practices. Therefore, the fiscal management system developed during the Phase II feasibility study utilizes modern management techniques that have proven themselves as valuable tools to decision makers in other organizational environments.

Fiscal Strategy

In an attempt to resolve the foregoing problems, this project has undertaken the development of a fiscal management system which will greatly facilitate the optimal utilization of project resources. The project commited itself to this task in the proposal for the Phase II Feasibility Study.

The program model described in the body of this report is primarily concerned with testing the feasibility of an individualized, performance-based instructional system. A performance-criteria approach to instructional management promises economy in the allocation of educational resources. Educational objectives pinned to predictable and measurable student performance will provide a much needed basis for measuring program costs against program effectiveness. A system of program cost accounting will promote more effective allocation of resources among competing instructional alternatives. Because of the structure of the instructional model, the majority of the costs can no longer be associated with an individual instructor and his classroom of students, but rather with individually utilized instructional resources (options) designed to enable trainees to perform successfully teaching tasks.

Performance oriented objectives are amenable to cost-effectiveness studies and the application of modern management techniques. By associating costs with the achievement of performance objectives it will be possible to associate behavioral change with program costs. If this can be accomplished, a sound basis for educational cost-effectiveness will have been established.

The following discussions of PPBS, standard cost accounting, flexible budgeting and other accounting concepts are presented in a generic sense and also as they specifically apply to the fiscal management system described in Chapter IV of this report.

Planning-Programming-Budgeting-System

PPB is a system devoted to assisting administrators in making decisions on the allocation of resources among instructional alternatives. It focuses on present and projected output in terms of instructional effectiveness. Its essence is the development and presentation of information pertaining to the full implications, costs and benefits of alternative courses of action relevant to major resource allocation decisions.

There are just two major conceptual components of a PPB system--the notion of a program budget and the techniques of cost-effectiveness analysis (also called cost-benefit analysis and applied economic analysis).

Program Budget

The primary distinctive characteristics of the program budget include:

1. An identification of the fundamental objectives of governmental (or educational) organization and the relating of all activities to these (regardless of organizational placement).
2. A consideration of future year implications.
3. A consideration of all pertinent costs.[1]

Cost-Effectiveness Analysis

Systematic analysis of alternatives is the major function of cost-effectiveness. This characteristic is also the crux of PPBS. It involves:

1. Identification of the program objectives.
2. Explicit, systematic identification of alternative ways of carrying out the objectives.
3. Estimates of the total cost implications of each alternative.

4. Estimates of the expected results of each alternative.[2]

Cost-effectiveness analysis can be defined as an attitude and set of formal and informal techniques which relate the costs and benefits of instructional alternatives in a rigorous quantitative and qualitative fashion so that decisions can be made about preferred courses of action. This concept, simply stated, enables decision-makers to choose from feasible alternatives on the basis of least cost and greatest effectiveness. Admittedly, not all the problems implied in the definition above have been solved. Nevertheless the fiscal management system developed for the FSU Model insures the continual and systematic evaluation of both costs and effectiveness. (See Chapter IV--Figures 14 and 15.)

Standard Cost Accounting

Initial steps of a fully integrated and operable total fiscal management system must include the formulation of a systematic means of accumulating a data base of relevant financial information. The various techniques of cost accounting offer just such a vehicle.

The fiscal management sytem developed and field tested during Phase II essentially utilizes a modification of standard cost accounting. As an accounting mechanism, standard costs offer the following advantages over other types of cost acccounting systems.

1. "Standards make possible the application of the "principle of exception", which means that the attention of management is centered primarily on cases of below-and above-standard time, cost and performance."
2. "Standards are an economical means of cost accounting and generally result in a lower cost of cost accounting."[3]

Standard costs are actually predetermined costs established prior to operation. Ideally, the determination of standards result from scientific facts compiled from systematic study and analysis that considers both past experience and controlled experiments. In addition, arriving at standard costs requires expert knowledge of equipment and materials to be used, time studies to determine a labor cost, and accurate measures of overhead. In other words, standards are target costs which should be attained by an optimal utilization of resources.

The prototype implementation was in reality a field test and thus an "initial experience." Therefore, since there was really no way of determining "accurate" standards, it became incumbent upon the cost analyst to confer regularly with the curriculum developers to determine gross standards. Although gross standards were used in the prototype, they adequately provided a means for testing the system in terms of comparing actual data with standard data to derive variances. Other organizations have found such a procedure to be normal for initial stages on new projects.

Under a standard cost system variances are used to permit comparison of actual and predetermined or standard costs. Variances represent the dollar difference between the expected or standard costs and the costs actually incurred. The fiscal management system developed for the FSU Model is capable of automatically comparing standard costs with actual costs on a periodic or "as needed" basis. Consequently, the principle of "management by exception" becomes integrated into the system.

Total variances are generated in printout formats in a variety of ways. Beginning with the smallest accumulative unit of activity, total variances are available for each cost center. If a larger financial "exceptions" picture is desired, variances are retrievable at the summative level of enablers, tasks and total program.

While total variances indicate a favorable, unfavorable or an "on target" condition, further analysis of any large variances or "exceptions" can also be retrieved. These more detailed analyses of variances signal whether the reason for the variance lies in labor, material, variable overhead or fixed overhead. An even more refined analysis indicates whether the cause of the variance results from the amount of time or number of units of material consumed, or in the cost of these items.

Variances, as shown in cost printouts 4, 5, and 6 in Appendix G, are labeled as Dr and Cr. The Dr label indicates a favorable variance and Cr refers to an unfavorable variance. Favorable variances result from a lower actual cost than anticipated, while unfavorable variances denote a higher actual cost than anticipated. When favorable and/or unfavorable variances are assessed in terms of the output or instructional value of the activity unit in question, program managers can then modify future standards and thus affect the distribution of available resources.

Difference Between Standards and Budgets

Conceptually, there is very little variation between a "budget" and a "standard". When standards represent a realistic synthesis of the combined knowledge of the program personnel then the words are often used interchangeably. However, as used herein, the word "budget" connotes a cost expectancy of a total unit while "standard" reflects the expected future cost of each of the components of the unit. For example, the standard cost for one trainee for a particular instructional option may be $10; the budget for ten trainees would therefore be $100.

Flexible Operating Program Budget

The underlying principle of the flexible budget is the establishment of predetermined norms for expenditures at various levels of activity. Through this type of budget explicit recognition is given to the fact that educational enterprises are dynamic rather than static, and that different budget allowances are necessary for different rates of activity.

The preparation of a flexible budget, in reality, involves the construction of separate budgets for each volume of activity. For example, budgeting for the prototype field test in which twenty trainees were to be involved took the form of three separate budgets (See Appendix F) for each enabler. The Most Likely Budget represents the summation of predetermined costs for a utilization factor of ten (10) trainees in each of the available instructional options for a given enabler, while the Minimum and Maximum Budgets reflect densities of zero (0) trainees and twenty (20) trainees, respectively.

The purpose of flexible budgeting is twofold. First, easier comparison between budgeted and actual costs can be performed. Second, large variations in expected densities can be more meaningfully budgeted.

Two Schools of Thought Concerning Treatment of Fixed Cost

The literature on PPBS diverges on the treatment of variable and fixed overhead costs. On the one side are those who favor a separate presentation of direct and overhead costs, and on the other side are the proponents of a single "total" cost for each cost center. The former rationalize that overhead costs are difficult to distribute to cost centers; thus their separation from the direct costs of each cost center. The latter feel that since the total program costs should be equal to the sum of the cost centers, then a rational basis for allocation of overhead costs to cost centers must be devised.

The technique used for this management system is flexible enough to use either method. No change in computer programming would be required since overhead is now accumulated in total before allocation back to the appropriate cost centers. (See the sample total amounts for Variable and Fixed Overhead shown in printout 1, Appendix G).

Relevant Costs

Relevant or incremental costs are the difference in total cost between two alternative courses of action. Considering, for the purposes of field testing, that the program model was one alternative and the conventional teacher training program was the other, it was a goal of the cost analyst to provide a basis for investigating the financial difference between each alternative.

The costs considered relevant to both alternatives and which form the foundation for the projections in Chapter VII are labor, materials, operating capital outlay (equipment) and physical facilities. Whereas labor and material dollar costs were actually gathered, recorded, and analyzed via the fiscal management system, the use of equipment (video tape recorders, etc.) and physical facilities were monitored via manual utilization records. The reasons these relevant items were excluded from the fiscal management system are (1) the amortization of large single items of cost to a brief three-week test would undoubtedly lead to gross errors; and (2) since the present costs for these items vary within a wide range, it was more convenient and effective to determine prototype requirements and projected model program needs in terms of the number of units of equipment and square feet of facilities. These are reported in Chapter VII.

Certain costs are omitted from both alternatives since they do not affect the differences in total costs between the two alternatives. University administration and university overhead (i.e., plants and grounds) are examples of such irrelevant costs.

Textbook Definitions of Elements of Costs

The effectiveness of the fiscal management system is largely dependent on the manner in which the elements of cost are defined. Since the definitions used in the prototype were specifically designed to capture only certain relevant accounting data, the following generic textbook definitions are presented so that a comparison between the potential use of the fiscal system and its prototype field test use can be made.

> Direct Costs are those costs obviously traceable to a unit of output or a segment of operations (cost center). Direct costs are regularly of two kinds: (1) direct labor, and (2) direct materials. In both instances the direct labor and materials must be significant and traceable to a cost center.[4]
>
> Variable Overhead are those costs which are uniform per unit, but which fluctuate in total in direct proportion to changes in the related total activity or volume.[5]
>
> Fixed Overhead are those costs which, for a given period of time and range of activity called

> the relevant range, do not change in total but become progressively smaller on a per unit basis as volume increases.[6]

Definition and Proration of the Elements of Costs in the Prototype

While the fiscal management system has the capacity to analyze both operating and capital costs, it was felt that more relevant data could be provided to the project director and/or funding agents via a distinction and separation of operating and capital costs. Therefore, only labor and material operating costs were accounted for during the prototype implementation. For the prototype field test the elements of cost in the fiscal management system were defined as follows:

> Direct Labor--faculty, staff and graduate assistants' time which was devoted directly to any of the cost centers.
>
> Direct Materials--materials and supplies which were purchased during the prototype and disbursed for use in any of the cost centers.
>
> Variable Overhead--for purposes of the prototype field test variable overhead refers to informal counseling, or that informal interaction between project personnel and student trainees. All time and materials devoted to informal counseling are reported under variable overhead.
>
> Fixed Overhead--for purposes of the prototype field test fixed overhead refers to program and student administration or that time and materials utilized for the administration and management of curriculum, program, students and financial data.

The data accumulated from the prototype were prorated to the cost centers as follows:

1. Direct labor--reported and allocated directly to cost center;
2. Direct materials--reported and allocated directly to cost center;
3. Variable overhead--reported in total and allocated to cost centers on the basis of the

number of student hours accumulated for each cost center;

4. Fixed overhead--reported in total and allocated equally to each cost center.

The rationale for the types of cost included in the prototype follows:

1. In terms of the fiscal aspects of this project, major efforts were directed toward developing, testing, analyzing and evaluating a fiscal management system capable of providing relevant financial data for a full operational performance-based teacher training program. Therefore, the criteria of which costs to include in the prototype were secondary to the performance of the fiscal management system itself.
2. In terms of providing a basis for investigating the financial differences between a full operational version of the prototype and the conventional teacher training program available at FSU, cost figures had to be studied. The costs available from the FSU Annual Financial Report are of two kinds: (1) department related operational costs, and (2) capital outlay costs (primarily facilities) which are reported by school or college and cannot be directly associated with individual departments. Therefore to insure comparibility with the operating costs of those departments that were involved in the program model, only direct operating costs were included in the prototype financial data.
3. Since it was desired to include only operating costs in the prototype, variable overhead and fixed overhead were defined in terms of direct labor and materials and were prorated to the cost centers as follows: a) considerable amounts of time and materials were expected to be utilized in informal sessions (that is, not in the defined cost centers) and allocation on the basis of the total number of student hours incurred in each defined cost center appeared to provide a reasonable distribution of these costs to the cost centers; and b) the time and materials dedicated to program and student

administration affects all elements of the prototype. Therefore, an equal distribution of these costs to the cost centers represents those operating costs incurred regardless of the trainee utilization of the cost centers.

4. When direct labor and direct materials are added to the variable and fixed overhead figure, a total direct operating cost is derived. This sum is then comparable to the operating costs from the F.S.U. Annual Financial Report. When making such a comparison it must be noted, however, that the amounts reported in the Financial Report represent an underfunding in terms of the amounts due some departments based on the formula budgeting technique presently used at this university.

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1. Hatry, Harry P. "Considerations in Instituting a Planning-Programming-Budgeting-System (PPBS) in State and Local Governments." State and Local Finances Project. The George Washington University. October 7, 1966. p. 2.

2. _Ibid._, p. 2.

3. Wixon, Rufus, et.al. _Accountants' Handbook._ New York: The Ronald Press Company, 1960. p. 6.10.

4. _Ibid._, p. 6.5.

5. Horngren, Charles T. _Cost Accounting, A Managerial Emphasis._ Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1967. p. 855.

6. _Ibid._, p. 847

APPENDIX F

INSTRUCTIONS FOR COMPLETING PERSONNEL ACTIVITY SHEET

Under the heading Activity, please include either the description or code (from the Master Code Sheet) of the Tasks, Enablers, or Instructional Options where you devoted your time. That is, if you spent one hour of your time evaluating Tasks 001, 003, and 005, it should appear as:

Activity	Time Devoted
Evaluation of Tasks 001, 003, 005	1 hour

If a more detailed breakdown is possible it would appear as:

Evaluation of task 001	20 min.
" " " 003	15 "
" " " 005	25 "

In addition to professional services rendered to a specific Task, Enabler, or Instructional Option, at least two other activities could consume a portion of your time. We defined these two activities as follows:

Informal Counseling - For purposes of the field testing of the prototype, informal counseling refers to that informal interaction between project personnel and student trainees. Explicitly excluded from informal counseling is that counseling which precedes the entrance of a trainee into each task. Therefore, the time devoted to personal student problems, special assistance to trainees and other guidance and counseling which does not occur in formal sessions (i.e., pre-task counseling) should be reported under Informal Counseling.

Program and Student Administration - That time utilized for the administration and management of curriculum, program (in this case the prototype), students, and financial data.

For Informal Counseling and Program and Student Administration please include the time devoted in a single amount for the time period indicated at the top of Personnel Activity Sheet. It should appear as:

Activity	Time Devoted
Informal Counseling	12 hours
Program and Student Administration	2 hours

If there are any other activities that you wish to include please list and describe them at the bottom of the Personnel Activity Sheet.

PROJECT PERSONNEL ACTIVITY SHEET

Name_______________________________

Date(s)_____________________________

Activity	**Time Devoted**

DATA ENTERED BY PROJECT PERSONNEL

SUBMITTED TO FISCAL ANALYST

PERSONNEL ACTIVITY INPUT

NAME____

POSITION____

DATES____

TOTAL TIME DEVOTED______________________________

TOTAL COST______________________________________

AVERAGE COST PER HOUR___________________________

DISTRIBUTION OF TIME

TIME	VARIABLE OH	FIXED OH	COST CENTER
Tenths Hr	Informal Counselling	Program & Student Administration	

DATA ENTERED BY FISCAL ANALYST

SUBMITTED DIRECTLY TO KEYPUNCHING FOR ENTRY INTO FISCAL MANAGEMENT SYSTEM

4

MATERIAL INPUT

Material Type________________________

Total Units________________________

Total Cost________________________

Average Cost Per Unit_______________

Distribution of Materials

Units	Variable O.H.	Fixed O.H.	Cost Center

DATA ENTERED BY RESOURCE CENTER
LIBRARIAN AND FISCAL ANALYST

SUBMITTED DIRECTLY TO KEYPUNCHING
FOR ENTRY INTO FISCAL MANAGEMENT
SYSTEM

COST FILE ENABLER
FLEXIBLE BUDGET INPUT SHEET

TASK ___________

ENABLER ___________

MOST LIKELY

	Labor Time Rate	Materials Units Price	Variable OH Student Hrs.	Fixed Overhead
C.C. 1 --				
C.C. 2 --				
C.C. 3 FC				

MINIMUM

	Labor Time Rate	Materials Units Price	Variable OH Student Hrs	Fixed Overhead
C.C. 1 --				
C.C. 2 --				
C.C. 3 FC				

MAXIMUM

	Labor Time Rate	Materials Units Price	Variable OH Student Hrs	Fixed Overhead
C.C. 1 --				
C.C. 2 --				
C.C. 3 FG				

APPENDIX G

COST PRINTOUTS

```
                                                     ELEMENTARY TEACHING MODEL
                                                       ACTUAL COST PRORATION
                                                       INITIAL FIELD TESTING
L A B O R
                                              --------------------------------A L L O C A T I O N---------------------------
                              AVERAGE           VARIABLE               FIXED
PROFESSOR   TOTAL    HOURS    COST PER          OVERHEAD            OVERHEAD       ------------C O S T  C E N T E R---------
 NUMBER      COST    WORKED     HOUR          TIME     COST       TIME     COST        TIME         TOTAL COST     COST CENTER CODE
                                             11.5    43.12
  004      110.98    29.6       3.74
*****************************************************************************************************************************************
                                                               48.0   180.00
  005      180.00    48.0       3.75
*****************************************************************************************************************************************
                                                               62.0   232.50
  006      232.50    62.0       3.75
*****************************************************************************************************************************************
                                                               64.0   240.00
  007      240.00    64.0       3.75
*****************************************************************************************************************************************
                                                                                     1.8         12.15           001 010 3PT
                                                                                     1.8         12.15           002 010 3PT
                                                                                     1.8         12.15           003 010 3PT
                                                                                     1.8         12.15           004 010 3PT
                                                                                     1.8         12.15           005 010 3PT
                                                                                     1.8         12.15           006 010 3PT
                                                                                     1.8         12.15           007 010 3PT
                                                                                     1.8         12.15           008 010 3PT
                                                                                     1.8         12.15           009 010 3PT
                                                                                     1.8         12.15           010 010 3PT
                                                               22.0   148.50
                                             60.0   405.00
  008      675.00   100.0       6.75
*****************************************************************************************************************************************
                                                                                     2.6         17.55           001 010 3PT
                                                                                     2.6         17.55           002 010 3PT
                                                                                     2.6         17.55           003 010 3PT
                                                                                     2.6         17.55           004 010 3PT
                                                                                     2.6         17.55           005 010 3PT
                                                                                     2.6         17.55           006 010 3PT
                                                                                     2.6         17.55           007 010 3PT
                                                                                     2.6         17.55           008 010 3PT
                                                                                     2.6         17.55           009 010 3PT
                                                                                     2.6         17.55           010 010 3PT
                                                               37.5   253.12
                                             56.5   381.37
  009      809.99   120.0       6.74
*****************************************************************************************************************************************
                                                              120.0   644.40
  010      644.40   120.0       5.37
*****************************************************************************************************************************************
```

```
                                                      ELEMENTARY TEACHING MODEL
                                                       ACTUAL COST PRORATION
                                                       INITIAL FIELD TESTING

                                              ------------------------------A L L O C A T I O N-----------------------------
                             AVERAGE             VARIABLE             FIXED
PROFESSOR    TOTAL    HOURS  COST PER            OVERHEAD            OVERHEAD        ------------C O S T  C E N T E R----------
 NUMBER       COST   WORKED    HOUR           TIME     COST       TIME     COST           TIME       TOTAL COST   COST CENTER CODE
                                                                 15.0  101.25
  011       101.25    15.0     6.75
**********************************************************************************************************************************************

                                                                163.0  489.00
  012       489.00   163.0     3.00
**********************************************************************************************************************************************

                                                                 12.0   25.20
  013        25.20    12.0     2.10
**********************************************************************************************************************************************

                                                                 86.0  322.50
  014       322.50    86.0     3.75
**********************************************************************************************************************************************

                                                                 60.0  225.00
  015       225.00    60.0     3.75
**********************************************************************************************************************************************

                                                                 99.0  371.25
  016       371.25    99.0     3.75
**********************************************************************************************************************************************

                                                                 68.5  616.50
                                             20.5   184.50
  017       801.00    89.0     9.00
**********************************************************************************************************************************************

TOTAL
LABOR      5686.46   1191.0                  157.4  1047.36      895.4  3962.55         139.9       676.55
```

```
                                                 ELEMENTARY TEACHING MODEL
                                                  ACTUAL COST PRORATION
                                                  INITIAL FIELD TESTING
M A T E R I A L
                                            ----------------------------A L L O C A T I O N----------------------------
                            AVERAGE          VARIABLE           FIXED
MATERIAL   TOTAL    UNITS   COST PER         OVERHEAD          OVERHEAD          -----------C O S T  C E N T E R----------
           COST               UNIT         UNIT    COST      UNIT    COST            UNIT      TOTAL COST   COST CENTER CODE
                                                                                     5.0          3.25       010 002 201
  500       3.25     5.0       .65                                                                           010 002 201
******************************************************************************************************************************
                                                                                     1.0          3.10       001 002 310
                                                                                     1.0          3.10       001 003 310
                                                                                     1.0          3.10       006 006 310
  501       9.30     3.0      3.10                                                                           006 006 310
******************************************************************************************************************************
                                                                                     1.0          2.50       004 004 302
  502       2.50     1.0      2.50                                                                           004 004 302
******************************************************************************************************************************
                                                                                     3.0         12.00       006 006 211
                                                                                     1.0          4.00       010 002 101
  503      16.00     4.0      4.00                                                                           010 002 101
******************************************************************************************************************************
                                                                                     9.0           .45       001 002 101
                                                                                    10.0           .50       001 002 201
                                                                                    11.0           .55       001 003 101
                                                                                    14.0           .70       002 002 101
                                                                                    18.0           .90       002 002 201
                                                                                    16.0           .80       002 003 101
                                                                                     8.0           .40       002 006 101
                                                                                    12.0           .60       003 002 201
                                                                                     7.0           .35       004 002 101
                                                                                    29.0          1.45       004 004 101
                                                                                    18.0           .90       004 005 202
                                                                                    16.0           .80       006 003 201
                                                                                    48.0          2.40       006 004 101
                                                                                    23.0          1.15       006 005 101
                                                                                    33.0          1.65       007 002 101
                                                                                    26.0          1.30       007 004 101
                                                                                    28.0          1.40       008 002 101
                                                                                    21.0          1.05       008 004 101
                                                                                     8.0           .40       008 006 101
                                                                                     9.0           .45       009 003 101
                                                                                    18.0           .90       009 003 201
                                                                                     6.0           .30       009 004 101
                                                                                    18.0           .90       010 004 100
                                                                 85.0    4.25
                                           42.0    2.10
  504      26.65   533.0       .05
******************************************************************************************************************************

TOTAL
MATERIAL   57.70   546.0                   42.0    2.10          85.0    4.25       419.0         51.35
```

```
                                                 ELEMENTARY TEACHING MODEL
                                                    COST CENTER PROFILE
                                                   INITIAL FIELD TESTING

                              ------------------------------S T A N D A R D S------------------------------   ---------ACTUAL--------

                              --------MINIMUM-------   ------MOST LIKELY------   --------MAXIMUM-------
              COST CENTER     TIME-                    TIME-                     TIME-                      TIME-
                  CODE        UNITS    RATE   TOTAL    UNITS    RATE   TOTAL     UNITS    RATE   TOTAL      UNITS    RATE   TOTAL

LABOR         003 002 101              4.00              2.0    7.00   14.00       3.0   10.00   30.00

MATERIAL      003 002 101

VAR-OVERHEAD  003 002 101              5.00             15.0    7.00  105.00      30.0    9.00  270.00        4.4    3.83   16.85

FIXED-OVHEAD  003 002 101                     15.00                    30.00                     45.00                      30.51

TOTAL         003 002 101                     15.00                   149.00                    345.00                      47.36

STD COST PER  003 002 101
STUDENT HOUR  003 002 101                                               9.93
```

ELEMENTARY TEACHING MODEL
COST CENTER PROFILE
INITIAL FIELD TESTING

		STANDARDS									ACTUAL		
		MINIMUM			MOST LIKELY			MAXIMUM					
	COST CENTER CODE	TIME-UNITS	RATE	TOTAL	TIME-UNITS	RATE	TOTAL	TIME-UNITS	RATE	TOTAL	TIME-UNITS	RATE	TOTAL
LABOR	003 002 201		4.00		2.0	7.00	14.00	3.0	10.00	30.00			
MATERIAL	003 002 201				10.0	1.00	10.00	1.0	1.00	1.00	12.0	.05	.60
VAR-OVERHEAD	003 002 201		5.00		15.0	7.00	105.00	30.0	9.00	270.00	3.6	3.83	13.79
FIXED-OVHEAD	003 002 201			15.00			30.00			45.00			30.51
TOTAL	003 002 201			15.00			159.00			346.00			44.90
STD COST PER STUDENT HOUR	003 002 201 003 002 201						10.60						

```
                                                        ELEMENTARY TEACHING MODEL
                                                       FREE CHOICE OPTION PROFILE
                                                         INITIAL FIELD TESTING
                                                           ACTUAL COST DATA

                        NUMBER    STUDENT   AVERAGE    TOTAL         LABOR                      MATERIAL         VARIABLE OVERHEAD      FIXED
COST CENTER NUMBER        OF       HOURS     COST       COST  TIME   RATE   COST        UNITS   RATE   COST      RATE   COST         OVERHEAD
                       STUDENTS             PER HOUR
001 002 3FC               3          .9      41.11     37.05    .0    0.0    .00         11.0    .05    .55      3.83   3.44           30.51
001 003 3FC               1          .5      71.06     35.53    .0    0.0    .00          1.0   3.10   3.10      3.83   1.92           30.51
003 003 3FC               1          .1     308.90     30.89    .0    0.0    .00           .4   2.00    .80      3.83    .38           30.51
003 004 3FC               1          .7      47.40     33.19    .0    0.0    .00           .0    .00    .00      3.83   2.68           30.51
004 003 3FC               1          .6      54.61     32.81    .0    0.0    .00           .0    .00    .00      3.83   2.30           30.51
004 004 3FC               1         1.0      36.84     36.84    .0    0.0    .00          1.0   2.50   2.50      3.83   3.83           30.51
005 004 3FC               1          .4      80.10     32.04    .0    0.0    .00           .0    .00    .00      3.83   1.53           30.51
006 005 3FC               1          .4      80.10     32.04    .0    0.0    .00           .0    .00    .00      3.83   1.53           30.51
006 006 3FC               1          .3     117.13     35.14    .0    0.0    .00          1.0   3.10   3.10      3.83   1.53           30.51
001 003 3FC               1         1.2      29.26     35.11    .0    0.0    .00           .0    .00    .00      3.83   4.60           30.51

                         12         6.1               304.64                 .00                        10.05           23.79          305.10
```

```
                                                              ELEMENTARY TEACHING MODEL
                                                              SUB-TASK 003 002 REPORT
                                                               INITIAL FIELD TESTING

                            TIME/UNIT   STANDARD     TOTAL  TIME/UNIT  ACTUAL       TOTAL   TIME/UNIT      VARIANCE        TOTAL
                                          RATE                          RATE                                 RATE
COST CENTER 101
 LABOR----------------         2.0       $7.00     $14.00      .       $.           $.00   $14.00DR       $.00DR       $14.00DR
 MATERIALS------------         0.0        $.00       $.00     .0       $.           $.00       $.00        $.00           $.00
 VARIABLE OVERHEAD--          15.0       $7.00    $105.00    4.4     $3.83        $16.85   $74.20DR    $13.94DR        $88.15DR
 FIXED OVERHEAD-----           0.0        $.00     $30.00    0.0      $.00        $30.51       $.00        $.00          $.51CR
TOTAL COST CENTER 101---------------------        $149.00                          $47.36                             $101.64DR

COST CENTER 201
 LABOR----------------         2.0       $7.00     $14.00    0.0      $.00          $.00   $14.00DR       $.00DR       $14.00DR
 MATERIALS------------        10.0       $1.00     $10.00  120.0      $.05         $6.00  $110.00CR   $114.00DR        $4.00DR
 VARIABLE OVERHEAD--          15.0       $7.00    $105.00    3.6     $3.83        $13.78   $79.80DR    $11.41DR        $91.22DR
 FIXED OVERHEAD-----           0.0        $.00     $30.00    0.0      $.00        $30.51       $.00        $.00          $.51CR
TOTAL COST CENTER 201---------------------        $159.00                          $50.29                             $108.71DR

COST CENTER 3FC
 LABOR----------------         2.0       $7.00     $14.00      .       $.           $.00   $14.00DR       $.00DR       $14.00DR
 MATERIALS------------         2.0       $2.00      $4.00     .0       $.           $.00    $4.00DR       $.00DR        $4.00DR
 VARIABLE OVERHEAD--           5.0       $7.00     $35.00    0.0     $3.83          $.00   $35.00DR       $.00DR       $35.00DR
 FIXED OVERHEAD-----           0.0        $.00     $30.00    0.0      $.00        $30.51       $.00        $.00          $.51CR
TOTAL, COST CENTER 3FC--------------------         $83.00                          $30.51                              $52.49DR


SUB-TASK 002
 LABOR----------------         6.0       $7.00     $42.00    0.0      $.00          $.00   $42.00DR       $.00DR       $42.00DR
 MATERIALS------------        12.0       $1.16     $13.92  120.0      $.05         $6.00  $125.28CR   $133.20DR        $7.92DR
 VARIABLE OVERHEAD--          35.0       $7.00    $245.00    8.0     $3.82        $30.56  $189.00DR    $25.44DR       $214.44DR
 FIXED OVERHEAD-----           0.0        $.00     $60.00    0.0      $.00        $61.02       $.00        $.00         $1.02CR
TOTAL SUB-TASK 003 002                            $360.92                          $97.58                             $263.34DR
```

```
                                           ELEMENTARY TEACHING MODEL
                                            SUB-TASK 003 003 REPORT
                                             INITIAL FIELD TESTING
                                  STANDARD                          ACTUAL                                 VARIANCE
                       TIME/UNIT    RATE        TOTAL  TIME/UNIT     RATE       TOTAL   TIME/UNIT             RATE          TOTAL
COST CENTER 101
  LABOR---------------      2.0    $7.00       $14.00        .        $.        $.00   $14.00DR            $.00DR       $14.00DR
  MATERIALS-----------      0.0     $.00         $.00       .0        $.        $.00       $.00              $.00           $.00
  VARIABLE OVERHEAD--      17.0    $7.00      $119.00      7.0     $3.83      $26.81   $70.00DR          $22.19DR       $92.19DR
  FIXED OVERHEAD-----       0.0     $.00       $30.00      0.0      $.00      $30.51       $.00              $.00         $.51CR
TOTAL COST CENTER 101-------------------      $163.00                         $57.32                                   $105.68DR

COST CENTER 221
  LABOR---------------      2.0    $7.00       $14.00        .        $.        $.00   $14.00DR            $.00DR       $14.00DR
  MATERIALS-----------      0.0     $.00         $.00       .0        $.        $.00       $.00              $.00           $.00
  VARIABLE OVERHEAD--      15.0    $7.00      $105.00      9.6     $3.83      $36.76   $37.80DR          $30.43DR       $68.24DR
  FIXED OVERHEAD-----       0.0     $.00       $30.00      0.0      $.00      $30.51       $.00              $.00         $.51CR
TOTAL COST CENTER 221-------------------      $149.00                         $67.27                                    $81.73DR

COST CENTER 3FC
  LABOR---------------      2.0    $7.00       $14.00        .        $.        $.00   $14.00DR            $.00DR       $14.00DR
  MATERIALS-----------      2.0    $2.00        $4.00       .0        $.        $.00    $4.00DR            $.00DR        $4.00DR
  VARIABLE OVERHEAD--       5.0    $7.00       $35.00      0.1     $3.83        $.38   $34.30DR            $.31DR       $34.62DR
  FIXED OVERHEAD-----       0.0     $.00       $30.00      0.0      $.00      $30.51       $.00              $.00         $.51CR
TOTAL COST CENTER 3FC-------------------       $83.00                         $30.89                                    $52.11DR

SUB-TASK 003
  LABOR---------------      6.0    $7.00       $42.00      0.0      $.00        $.00   $42.00DR            $.00DR       $42.00DR
  MATERIALS-----------      2.0    $2.00        $4.00      0.0      $.00        $.00    $4.00DR            $.00DR        $4.00DR
  VARIABLE OVERHEAD--      37.0    $7.00      $259.00     16.7     $3.82      $63.79  $142.10DR          $53.10DR      $195.21DR
  FIXED OVERHEAD-----       0.0     $.00       $60.00      0.0      $.00      $61.02       $.00              $.00        $1.02CR
TOTAL SUB-TASK 003 003                        $365.00                        $124.81                                   $240.19DR
```

```
                                           ELEMENTARY TEACHING MODEL
                                            TASK NUMBER 003 REPORT
                                             INITIAL FIELD TESTING
                                   STANDARD                             ACTUAL                                VARIANCE
                        TIME/UNIT    RATE        TOTAL   TIME/UNIT      RATE       TOTAL    TIME/UNIT           RATE          TOTAL
SUB-TASK 001
 LABOR---------------      6.0      $7.00       $42.00      0.0         $.00        $.00     $42.00DR          $.00DR       $42.00DR
 MATERIALS-----------      0.0       $.00         $.00      0.0         $.00        $.00       $.00             $.00          $.00
 VARIABLE OVERHEAD---      5.0      $7.00       $35.00      0.0         $.00        $.00     $35.00DR          $.00DR       $35.00DR
 FIXED OVERHEAD------      0.0       $.00         $.00      0.0         $.00      $61.02       $.00             $.00        $61.02CR
TOTAL SUB-TASK 001                              $77.00                            $61.02                                    $15.98DR

SUB-TASK 002
 LABOR---------------      6.0      $7.00       $42.00      0.0         $.00        $.00     $42.00DR          $.00DR       $42.00DR
 MATERIALS-----------     12.0      $1.16       $13.92    120.0         $.05       $6.00    $125.28CR       $133.20DR        $7.92DR
 VARIABLE OVERHEAD---     35.0      $7.00      $245.00      8.0        $3.82      $30.56    $189.00DR        $25.44DR      $214.44DR
 FIXED OVERHEAD------      0.0       $.00       $60.00      0.0         $.00      $61.02       $.00             $.00         $1.02CR
TOTAL SUB-TASK 002                             $360.92                            $97.58                                   $263.34DR

SUB-TASK 003
 LABOR---------------      6.0      $7.00       $42.00      0.0         $.00        $.00     $42.00DR          $.00DR       $42.00DR
 MATERIALS-----------      2.0      $2.00        $4.00      0.0         $.00        $.00      $4.00DR          $.00DR        $4.00DR
 VARIABLE OVERHEAD---     37.0      $7.00      $259.00     16.7        $3.82      $63.79    $142.10DR        $53.10DR      $195.21DR
 FIXED OVERHEAD------      0.0       $.00       $60.00      0.0         $.00      $61.02       $.00             $.00         $1.02CR
TOTAL SUB-TASK 003                             $365.00                           $124.81                                   $240.19DR

SUB-TASK 004
 LABOR---------------      6.0      $7.00       $42.00      0.0         $.00        $.00     $42.00DR          $.00DR       $42.00DR
 MATERIALS-----------      2.0      $2.00        $4.00      0.0         $.00        $.00      $4.00DR          $.00DR        $4.00DR
 VARIABLE OVERHEAD---     15.0      $7.00      $105.00      6.0        $3.82      $22.92     $63.00DR        $19.08DR       $82.08DR
 FIXED OVERHEAD------      0.0       $.00       $60.00      0.0         $.00      $61.02       $.00             $.00         $1.02CR
TOTAL SUB-TASK 004                             $211.00                            $83.94                                   $127.06DR

SUB-TASK 010
 LABOR---------------      2.0      $7.00       $14.00     12.4        $5.01      $62.12     $72.80CR        $24.67DR       $48.12CR
 MATERIALS-----------      0.0       $.00         $.00      0.0         $.00        $.00       $.00             $.00          $.00
 VARIABLE OVERHEAD---      5.0      $7.00       $35.00      8.0        $3.83      $30.64     $21.00CR        $25.36DR        $4.36DR
 FIXED OVERHEAD------      0.0       $.00       $60.00      0.0         $.00      $61.02       $.00             $.00         $1.02CR
TOTAL SUB-TASK 010                             $109.00                           $153.78                                    $44.78CR

TASK 003
 LABOR---------------     26.0      $7.00      $182.00     12.4        $5.00      $62.00     $95.20DR        $24.80DR      $120.00DR
 MATERIALS-----------     16.0      $1.37       $21.92    120.0         $.05       $6.00    $142.48CR       $158.40DR       $15.92DR
 VARIABLE OVERHEAD---     97.0      $7.00      $679.00     38.7        $3.82     $147.83    $408.10DR       $123.06DR      $531.17DR
 FIXED OVERHEAD------      0.0       $.00      $240.00      0.0         $.00     $305.10       $.00             $.00        $65.10CR
TOTAL TASK 003                                $1122.92                           $520.93                                   $601.99DR
```

```
                                      ELEMENTARY TEACHING MODEL
                                            PROGRAM COST
                                        INITIAL FIELD TESTING

                               STANDARD                       ACTUAL                          VARIANCE
                     TIME/UNIT     RATE      TOTAL TIME/UNIT    RATE     TOTAL   TIME/UNIT        RATE        TOTAL
TASK 001
 LABOR--------------      41.0    $7.00    $287.00      11.9   $4.65    $55.33   $203.70DR    $27.96DR    $231.67DR
 MATERIALS----------      14.0    $1.74     $24.36     320.0    $.23    $73.60   $532.44CR   $483.20DR     $49.24CR
 VARIABLE OVERHEAD--      99.0    $7.00    $693.00      28.1   $3.82   $107.34   $496.30DR    $89.35DR    $585.66DR
 FIXED OVERHEAD-----       0.0     $.00    $360.00       0.0    $.00   $427.14        $.00        $.00     $67.14CR
TOTAL TASK 001                            $1364.36                     $663.41                            $700.95DR

TASK 002
 LABOR--------------      41.0    $7.00    $287.00       5.9   $5.23    $30.85   $245.70DR    $10.44DR    $256.15DR
 MATERIALS----------      14.0    $1.74     $24.36     560.0    $.05    $28.00   $950.04CR   $946.40DR      $3.64CR
 VARIABLE OVERHEAD--     104.0    $7.00    $728.00       6.0   $3.81    $22.86   $686.00DR    $19.14DR    $705.14DR
 FIXED OVERHEAD-----       0.0     $.00    $360.00       0.0    $.00   $427.14        $.00        $.00     $67.14CR
TOTAL TASK 002                            $1399.36                     $508.85                            $890.51DR

TASK 003
 LABOR--------------      26.0    $7.00    $182.00      12.4   $5.00    $62.00    $95.20DR    $24.80DR    $120.00DR
 MATERIALS----------      16.0    $1.37     $21.92     120.0    $.05     $6.00   $142.48CR   $158.40DR     $15.92DR
 VARIABLE OVERHEAD--      97.0    $7.00    $679.00      38.7   $3.82   $147.83   $408.10DR   $123.06DR    $531.17DR
 FIXED OVERHEAD-----       0.0     $.00    $240.00       0.0    $.00   $305.10        $.00        $.00     $65.10CR
TOTAL TASK 003                            $1122.92                     $520.93                            $601.99DR

TASK 004
 LABOR--------------      40.0    $7.00    $280.00      17.3   $5.00    $86.50   $158.90DR    $34.60DR    $193.50DR
 MATERIALS----------      15.0    $1.53     $22.95     550.0    $.09    $49.50   $818.55CR   $792.00DR     $26.55CR
 VARIABLE OVERHEAD--      97.0    $7.00    $679.00      24.7   $3.82    $94.35   $506.10DR    $78.54DR    $584.65DR
 FIXED OVERHEAD-----       0.0     $.00    $300.00       0.0    $.00   $366.12        $.00        $.00     $66.12CR
TOTAL TASK 004                            $1281.95                     $596.47                            $685.48DR

TASK 005
 LABOR--------------      35.0    $7.00    $245.00      18.0   $5.02    $90.36   $119.00DR    $35.64DR    $154.64DR
 MATERIALS----------       6.0    $2.00     $12.00       0.0    $.00      $.00    $12.00DR      $.00DR     $12.00DR
 VARIABLE OVERHEAD--      64.0    $7.00    $448.00      36.8   $3.81   $140.20   $190.40DR   $117.39DR    $307.80DR
 FIXED OVERHEAD-----       0.0     $.00    $240.00       0.0    $.00   $305.10        $.00        $.00     $65.10CR
TOTAL TASK 005                             $945.00                     $535.66                            $409.34DR

TASK 006
 LABOR--------------      44.0    $7.00    $308.00      20.4   $5.00   $102.00   $165.20DR    $40.80DR    $206.00DR
 MATERIALS----------      19.0    $1.60     $30.40     910.0    $.21   $191.10  $1425.60CR  $1264.90DR    $160.70CR
 VARIABLE OVERHEAD--     139.0    $7.00    $973.00      50.3   $3.81   $191.64   $620.90DR   $160.45DR    $781.36DR
 FIXED OVERHEAD-----       0.0     $.00    $360.00       0.0    $.00   $427.14        $.00        $.00     $67.14CR
TOTAL TASK 006                            $1671.40                     $911.88                            $759.52DR
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                                              ELEMENTARY TEACHING MODEL
                                                    PROGRAM COST
                                                INITIAL FIELD TESTING

                                 STANDARD                        ACTUAL                                 VARIANCE
                      TIME/UNIT      RATE      TOTAL TIME/UNIT     RATE      TOTAL   TIME/UNIT        RATE        TOTAL
TASK 007
 LABOR---------------      30.0     $7.00    $210.00      16.4    $5.00     $82.00    $95.20DR    $32.80DR    $128.00DR
 MATERIALS-----------      12.0     $1.50     $18.00     590.0     $.05     $29.50   $867.00CR   $855.50DR     $11.50CR
 VARIABLE OVERHEAD--       69.0     $7.00    $483.00      30.0    $3.82    $114.60   $273.00DR    $95.40DR    $368.40DR
 FIXED OVERHEAD-----        0.0      $.00    $240.00       0.0     $.00    $305.10        $.00        $.00     $65.10CR
TOTAL TASK 007                               $951.00                       $531.20                            $419.80DR

TASK 008
 LABOR---------------      36.0     $7.00    $252.00      16.4    $5.00     $82.00   $137.20DR    $32.80DR    $170.00DR
 MATERIALS-----------      15.0     $1.60     $24.00     570.0     $.05     $28.50   $888.00CR   $883.50DR      $4.50CR
 VARIABLE OVERHEAD--       86.0     $7.00    $602.00      25.3    $3.82     $96.64   $424.90DR    $80.45DR    $505.36DR
 FIXED OVERHEAD-----        0.0      $.00    $330.00       0.0     $.00    $366.12        $.00        $.00     $36.12CR
TOTAL TASK 008                              $1208.00                       $573.26                            $634.74DR

TASK 009
 LABOR---------------      34.0     $7.00    $238.00      12.4    $4.65     $57.66   $151.20DR    $29.14DR    $180.34DR
 MATERIALS-----------       9.0     $1.66     $14.94     150.0     $.05      $7.50   $234.06CR   $241.50DR      $7.44DR
 VARIABLE OVERHEAD--       10.1     $7.00     $70.70      15.1    $3.81     $57.53    $35.00CR    $48.16DR     $13.17DR
 FIXED OVERHEAD-----        0.0      $.00    $240.00       0.0     $.00    $366.12        $.00        $.00    $126.12CR
TOTAL TASK 009                               $563.64                       $488.81                             $74.83DR

TASK 010
 LABOR---------------      35.0     $7.00    $245.00       8.8    $5.00     $44.00   $183.40DR    $17.60DR    $201.00DR
 MATERIALS-----------      12.0     $1.58     $18.96     240.0     $.33     $79.20   $360.24CR   $300.00DR     $60.24CR
 VARIABLE OVERHEAD--       10.5     $7.00     $73.50       5.9    $3.81     $22.47    $32.20DR    $18.82DR     $51.03DR
 FIXED OVERHEAD-----        0.0      $.00    $240.00       0.0     $.00    $305.10        $.00        $.00     $65.10CR
TOTAL TASK 010                               $577.46                       $450.77                            $126.69DR
PROGRAM
 LABOR---------------     362.0     $7.00   $2534.00     139.9    $4.95    $692.50  $1554.70DR   $286.79DR  $1,841.50DR
 MATERIALS-----------     132.0     $1.60    $211.20    4010.0     $.12    $481.20  $6204.80CR  $5934.80DR    $270.00CR
 VARIABLE OVERHEAD--      775.6     $7.00   $5429.20     260.9    $3.81    $994.02  $3602.90DR   $832.27DR  $4,435.18DR
 FIXED OVERHEAD-----        0.0      $.00   $2910.00       0.0     $.00   $3600.18        $.00        $.00    $690.18CR
TOTAL PROGRAM                              $11084.40                      $5767.90                          $5,316.50DR
```

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                ELEMENTARY TEACHING MODEL
              TIME AND COST BY COST CENTER

----COST CENTER----
TASK  SUB TASK  OPT     STUDENT NO     TIME          COST
                        262968618      1.7         $18.29
                        262987822      0.5          $5.38

TOTAL COST CENTER                       4.4         $47.34

 003     002     201    261028291      0.6          $7.47
                        261821181      0.7          $8.72
                        261842533      0.1          $1.24
                        262846508      0.7          $8.72
                        262987822      0.2          $2.49
                        263822436      0.7          $8.72
                        264840422      0.5          $6.23
                        265022608      0.1          $1.24
                        308503475      0.3          $3.73

TOTAL COST CENTER                       3.9         $48.56

 003     003     101    261842533      0.7          $5.72
                        262846508      1.7         $13.90
                        262969335      1.0          $8.18
                        262987822      0.5          $4.09
                        263822436      1.7         $13.90
                        264840422      0.5          $4.09
                        265022608      1.0          $8.18

TOTAL COST CENTER                       7.1         $58.06
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ELEMENTARY TEACHING MODEL
STUDENT PROFILE
INITIAL FIELD TESTING

STUDENT NUMBER	TOTAL TIME	TOTAL ACTUAL COST
261021618	83	$235.56
261028291	61	$73.36
261821181	130	$167.43
261842533	93	$120.28
262846508	163	$211.71
262887750	94	$117.52
262968618	266	$429.43
262969335	221	$365.72
262987822	247	$387.68
263028644	67	$122.69
263822436	105	$120.61
263909639	106	$146.67
264840422	126	$200.75
265022608	68	$78.61
266888223	189	$237.40
266947581	148	$189.97
267760300	77	$118.82
267849675	166	$300.41
308503475	283	$562.12

```
                          ELEMENTARY TEACHING MODEL
                                COST AND HOURS
                         BY STUDENT AND  COST CENTER

                         ------COST CENTER-------       ------ACTUAL-------
STUDENT NUMBER           TASK  SUB TASK  OPT CODE       TIME         COST

  261021618              002     002       101           02         $31.97
                         002     002       201           01         $31.79
                         002     003       101           04         $32.84
                         002     004       104           03         $16.39
                         002     010       3PT           05         $22.40
                         003     003       221           05          $3.50
                         003     004       107           05          $5.38
                         003     004       209           02          $7.54
                         005     002       122           05          $5.30
                         005     002       226           05          $4.73
                         005     003       201           01           $.92
                         005     010       3PT           08         $10.16
                         006     003       104           02          $2.12
                         006     004       101           06          $4.35
                         006     004       204                        $.00
                         006     006       211           02          $4.30
                         006     006       310           02         $17.57
                         006     010       3PT           08         $11.36
                         007     003       207           03          $3.43
                         007     010       3PT           06          $8.93
                         008     010       3PT           08         $10.58
** TOTAL                                                8.3        $235.56

  261028291              001     004       104           05          $5.30
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